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# CANADIAN ARCHITECT AND BUILDER.

VOL. IV.—No. III.

TORONTO AND MONTREAL, CANADA, MARCH, 1891.

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## —THE— CANADIAN ARCHITECT AND BUILDER,

*A Monthly Journal of Modern Constructive Methods,*

(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD),

PUBLISHED ON THE THIRD SATURDAY IN EACH MONTH IN THE INTEREST OF

ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS,  
DECORATORS, BUILDERS, CONTRACTORS, AND MANU-  
FACTURERS OF AND DEALERS IN BUILDING  
MATERIALS AND APPLIANCES.

**C. H. MORTIMER, Publisher,**

**14 King Street West, - TORONTO, CANADA.**

62 TEMPLE BUILDING, MONTREAL.

### SUBSCRIPTIONS.

The CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for \$2.00 per year. The price to subscribers in foreign countries, is \$2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, will be continued until instructions to discontinue are received and all arrearages paid.

### ADVERTISEMENTS.

Prices for advertising sent promptly on application. Orders for advertising should reach the office of publication not later than the 12th day of the month, and changes of advertisements not later than the 5th day of the month.

### EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

*The "Canadian Architect and Builder" is the official paper of the Architectural Associations of Ontario and Quebec.*

*The publisher desires to ensure the regular and prompt delivery of this journal to every subscriber, and requests that any cause of complaint in this particular be reported at once to the office of publication. Subscribers who may change their address should also give prompt notice of same, and in doing so, should give both the old and new address.*

THE competition for the proposed new City Hall at Quebec has resulted in the usual fizzle. Three plans received prizes and the other three were bought for \$300 each. And now one of the competitors is handed all six sets of plans with instructions to draw up new plans embodying the best points of each, the whole to be done under the superintendence of the city engineer. And so it goes on. When will the profession awake to a sense of their humiliating position, and insist, as a condition of their entering a competition, that a proper code be drawn up and that competent judges be appointed.

It was rather late in the day for the Canadian competitors for the Montreal Board of Trade building to cry out about the alleged unfairness of the award. If they had heeded the advice of both the Ontario and Quebec Associations they would have been spared the trouble and expense which they were put to without hope of reward, and would have helped to sustain these Associations in their protest against the unfair clauses in the conditions of the competition. We must say we have no sympathy with these disgruntled parties, some of whom probably thought they had seized a golden opportunity when their more competent brethren had decided to hold themselves aloof.

THERE seems to be a persistent effort in certain quarters to create a sentiment in favor of operating the Toronto street railway by the civic authorities. To our mind the simplest solution of the problem seems the best, viz., *the city to own the road-bed only*. By this means all questions of repairs, best form of tracks, curves and switches, etc., is in the hands and under the sole control of the city. The city would then be in a position to grant running powers over certain sections to more than one company. It is certain that as the city grows new routes will be developed. These new routes will require access to the heart of the city (as witness already the application of the Metropolitan and the Toronto and Weston companies) and it will never do to grant an independent right of way to each, as down town streets are already more than monopolized to the detriment of

vehicular traffic. It has generally been the case, when the company constructs the road-bed, that development slowly follows the growth of population, whereas, if in the hands of the city, development could be made in certain desirable instances to proceed and attract population. The civic authorities could make all needful regulations as to service, speed, frequency, over-crowding, fares, extensions, motive power, location of stables or power houses, method of application of power, position of wires or cables, rent of tracks, and in fact everything necessary to insure the establishment of a model system, with the minimum of trouble and responsibility on the part of the city.

WE are pleased to notice that an effort is being made by the City Engineer of Toronto in regard to the control or inspection of projecting signs, with a view to the safety of the public. We would go further—abolish them, and that other hideous deformity, the wooden verandah or shed which covers so many of our shop fronts. For our part we cannot understand how civilized beings with the slightest claim to the possession of taste in regard to the architectural appearance of their shops and warehouses can for a moment consent to have the fronts of these buildings disfigured and bedaubed as they are wont to be. No. 1 builds a pretensions front, and lavishes his money on terra cotta, pressed brick or cut stone. He no sooner assumed possession and bid good bye to his architect, than he hoists a great board abomination in front of and covering hundreds of dollars worth of ornament. No. 2 must do something to attract the public gaze from No. 1, and so procures a V shaped structure projecting away out into the street and secured to the light woodwork of a window frame or cornice with equally light rods and bolts which the first hurricane will wrench and hurl to the pavement, to the danger of the pedestrians beneath. No. 3, not to be outdone, concocts something bigger and more atrocious, and so it goes on from bad to worse. Could we not have a by-law forbidding all projecting signs? Surely the *street* does not belong to these people, and if they *will* have ugliness, why not compel them to keep off the street line with it? We would be glad to see a commission of public censors appointed, with authority to compel some attention to taste in such matters. Our citizens and visitors would soon notice a wonderful change for the better in our business fronts, and the shop-keepers themselves would be constrained to admit that it was a good thing that they were saved from their own abominations.

THE National Association of Master Builders, of the United States, now a well-organized body, held its fifth annual convention in New York, last month. One hundred and sixty one delegates were in attendance, representing some thirty-five cities scattered from the Atlantic to the Pacific Coast. In addition to the regular delegates, the alternates and visitors make up a list of over five hundred. Some important business was transacted. The Committee on Arbitration reported, advocating the settlement of disputes between employers and employees by referees. We are glad to see such an influential organization put itself on record in regard to this most important question, and although no very definite rules were recommended, an important step has been taken which ought to bear good fruit in the course of time. No doubt each year will see some practical detail added in improvement to the suggestions already put on record. The uniform contract, adopted at a former convention, and looked upon as nearly perfect by a complacent committee, had apparently no clause making the contractor responsible and holding the owner harmless for all accidents, damages, &c., through the carelessness or neglect of the former. No wonder lawyers flourish when such looseness in drawing up contracts prevails. The Trade Schools in New York and Philadelphia were visited by the delegates, and the object lessons thereby presented ought to bear good fruit. The leading men in the convention have expressed themselves as convinced that the best and most permanent work which may be accomplished by the Association will be the education of workmen by means of such schools. The quality of the work done by the pupils was a matter of astonishment to those who had not been cognizant of the standard set up by these institutions. The master builders of the Dominion of Canada would do well to imitate their brethren across the line. A Dominion



Association would prove of incalculable good if developed on right lines and with a broad policy looking to improved methods of building, the improvement of their workmen, and rational methods of settling disputes.

THERE have been in use in the large cities of the United States for some time various systems of automatic fire-alarms for stores, warehouses, etc. Some of these are now being brought forward in this country, and it is usual for the insurance companies to make some inducement to their clients when they are employed. When the alarm gong is located in the room or residence of an employee, or some other person connected with the concern, they would no doubt serve a useful purpose. It has been the practice in some cases to connect the building by means of a wire with the nearest fire station, but such a method cannot be too strongly deprecated. To do this it is necessary to sneak a wire over house tops or by some similarly devious route. This wire is liable to be a continual trouble. On the one hand, too much reliance may be placed on its being in order, and necessary vigilance in other directions relaxed, when through some cause it is incapable of transmitting a signal; and on the other hand, a false signal may be sent in, causing the brigade a run for nothing. This would not be of much moment except for the fact that some day a genuine alarm might be sent in, and on account of the previous cries of "wolf" when there was no wolf, a fatal amount of credulity might be attached to the warning. A preferable plan would be to place a continuous ringing gong on the outside of the house itself to call the attention of all and sundry to the fact that something was wrong within. The action of the sun on a flat roof has frequently been the means of sending in an alarm of fire when the thermostats have been closely adjusted; and if they are not closely adjusted, a fire might make considerable headway before notice was given. The proposal to connect these thermostats with the nearest fire alarm box to spring the alarm from the box, cannot be too strongly condemned. The less complication there is about a city fire alarm system the better, and the more likely it is to remain in working order when actually needed. The automatic fire alarm is good in its place, and might frequently be the means of saving a large amount of property, but keep it separate from the municipal system by all means.

#### THE RECENT O. A. A. CONVENTION.

THE Convention of the Ontario Association of Architects closed so near the time of going to press last month, that we had not the opportunity to say all we desired with reference to it. The tone of the whole proceedings indicated that the Association had settled down to solid business, and that the members were beginning to realize their position as an incorporated body, with the responsibilities connected therewith.

The address of the President, Mr. Storm, was concise and business like, reviewing the history of the Association up to date, and dwelling specially on the fact of incorporation having been obtained during the past year. If every architect would live up to the standard enunciated in the closing sentences, the profession would be one to be truly proud of, and would rank as it ought, and we hope soon will, with the other learned professions.

It was a source of great gratification to know that the incorporation of the Ontario Association was so quickly followed by that of the Quebec Association, some nine months only intervening. The incorporation of the latter was of course easier of accomplishment than the former, as it had the action of the Ontario Legislature for a precedent, while the pioneer Association had to vigorously work up their claims in the face of the absence of all precedent, being the first organization of the kind to receive incorporation.

It will now be in order for the two Associations to close up their ranks and work shoulder to shoulder with the object of ultimately obtaining such legislation as will permit only thoroughly qualified men to designate themselves "Architects."

The holding of the Convention in the School of Practical Science was a good idea, and the members availed themselves largely of the kindness of Prof. Galbraith and of Mr. Wright, the lecturer in the Architectural Department, who conducted the visitors over the building and explained the workings of the various departments. The equipment, which is still comparatively incomplete, will probably be in full working order by the next convention. The School and the profession will undoubtedly in the days to come be mutually helpful. The theoretical of the former blending with the practical experience to be gained in the offices of the latter, should combine to produce well rounded and thoroughly competent men in the near future.

An interesting discussion arose out of a resolution requesting the Council to prepare a form of certificate for the use of members of the Association. The discussion naturally ran into the question of the architect's responsibility in the matter, some speakers suggesting that the words "I hereby certify," &c., were too positive and committal, and that the words "To the best of my knowledge" should be put in as a safeguard. The resolution was lost after a vigorous summing up by the President, who took a manly view of the subject, saying, "I don't think any of these suggestions \* \* \* are favorable to us as a profession. If we undertake a certain duty, and we have certain responsibilities, we should shoulder them fairly and properly. If we issue a certificate it should show in its face what it is worth. It is as much as to say: 'I am satisfied that the work has been done

so far, and that man is entitled to so much money.' Take that responsibility, and hold it, and stand by it."

The question of an Association code which would govern the conditions of competitions entered into by members, caused a discussion which will no doubt be of benefit to some who are inclined to be weak-kneed. The Council was instructed to draft a code for future consideration, and will doubtless bring forward one which will be of great benefit alike to the public and the profession.

The chief points of discussion brought out by the reading of Mr. Bousfield's paper on "Architectural Education," were in reference to the draft curriculum which is being formulated by the Council. The trend of the debate indicated a decided desire on the part of members for an ultimately high standard of qualification, while not at present being too severe upon the students who have not had the opportunity or means to fit themselves for the coming examinations.

It seemed to be a matter of considerable surprise to the members when they were told in the Registrar's report that there were 140 names on the roll. This number must certainly embrace almost every practitioner in the Province. If it does, and even if not, it is evidence that the Association may become a power in the land—a power for good to themselves and also to the public.

If the Association is true to itself and to the traditions of a noble Guild, it cannot help but raise the standard of professional ethics, improve the building art both in matters of construction and design, and increase the respect, esteem and confidence of the public.

#### ESTIMATES WANTED.

THE publisher of the CANADIAN ARCHITECT AND BUILDER will pay \$20 in cash to the subscriber who sends to this office on or before the first day of May next, the most complete, most accurate and best arranged bill of quantities taken from the measured drawings of a residence published in this paper. The competitor who is awarded second position will receive a copy of the CANADIAN ARCHITECT AND BUILDER free for the term of one year.

The drawings upon which estimates are invited are those of a residence which has actually been built. They are accordingly practical, and the judges of the competition will have the advantage of being placed in the possession of all the data concerning the cost of the work.

Accompanying the drawings will be found complete specifications, with explanatory sketches where required.

In judging this competition regard will be had to perspicuity of arrangement of items, and the value of the schedule submitted as a practical guide to contractors who desire to be made acquainted with the most simple and accurate method of arriving at estimates of cost.

Competitors taking part in this competition must be subscribers to the CANADIAN ARCHITECT AND BUILDER.

Competitors must send in their bills of quantities signed only with a *nom de plume*, and must forward with them a separate, sealed envelope, containing their *nom de plume*, together with their actual names and addresses.

This competition is designed to result in practical benefit to contractors and architectural students in particular.

To the hap-hazard methods of estimating in use by the majority of contractors in Canada to-day, in lieu of methods based upon well-defined rules, can be traced the otherwise inexplicable variation of tenders, often ranging to 50 and 60 per cent. In the light of such wide variation, it may be a matter of regret, though not of surprise, that contractors find it so difficult to make a profit, and that every year so many of them go to the wall. It is with a view to assist contractors to estimate on a proper basis, and thus to avoid working to no profit, if not to actual loss, that this competition has been arranged.

It is hoped also that it may prove a help to architectural students, who will be called upon to present themselves for examination in this and other subjects.

Mr. Langley, of the firm of Langley & Burke, architects, Toronto, and Mr. Brown, of the firm of Brown & Love, contractors, have kindly consented to act as judges, their decision will and be final.

Let the interest manifested in this competition by contractors, students, etc., correspond to the importance of the subject, and the result should be highly satisfactory and valuable to every reader.

#### PROVINCIAL LAND SURVEYORS.

THE convention of the Association of Provincial Land Surveyors, held in Toronto a fortnight ago, was one of interest and profit. The address of the President, Mr. Sankey, showed that during the six years since the Association was organized, forty papers on various subjects have been presented to the members. The question of incorporation is now the most important one engaging attention. A movement is also on foot with the object of affiliating the various Provincial Associations with the Dominion Association. The officers elected for the current year are as follows: President, Villiers Sankey; Vice-President, E. Stewart, Kincardine; Secretary-Treasurer, A. J. VanNostrand; Councillors, H. B. Proudfoot, M. Gaviller, T. H. Jones, James Dickson, H. J. Bowman, M. J. Butler, H. D. Ellis, C. Unwin, J. C. McNabb, W. R. Aylesworth; Scrutineers, T. B. Speight and F. L. Foster.



## QUEBEC.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

MR. J. F. PEACHY, architect, has been authorized to prepare plans for the proposed new city hall, appropriating any good points he may find in the designs submitted in the late competition, in which Mr. Peachy was also a prize winner. The owners of designs not awarded prizes have allowed the city to retain their plans, the latter paying each competitor \$300. Mr. Charest, who was awarded 1st prize, has since then been appointed architect in the Public Works Department; Mr. P. Cousin of that Department has resigned, and entered upon private practice.

Work on the skating rink, the re-construction of which has been delayed for nearly two years owing to some misunderstanding between the directors and the Federal Government, is to be started as soon as the weather permits. It is to be of the same size as the former rink, the roof arches of which are to be used again. The general plan is being entirely changed, some new features, including a curling rink, being introduced. The contract has been awarded for \$10,000 to Geo. Boiteau; H. Staveley, architect.

Mr. Raymond, architect, has given out contracts for a wholesale store on St. Paul street for Messrs. Dupuis, probable cost \$15,000.

Several private residences and some stores are talked of for St. John street, but at the time of writing the elections are so absorbing that nothing else receives much attention.

The "Fortress Hotel" Co. received tenders for their proposed new building on 19th ult. The lowest tenderers are Quebecers. Several Montreal and one Brockville contractor also made bids. The plans upon which tenders were called were those made by Messrs. Rotch & Tilden, Boston. The cost of building, when entirely completed, will probably reach \$220,000. No tender has so far been accepted.

The Roberval Hotel at Roberval, Lake St. John, is being largely increased in capacity by the addition of two new wings, besides another building containing billiard room and bowling alley; the hotel, with the additions, will comprise about 150 bed rooms. The new dining hall, to be finished in spruce, will have seating capacity for 160 persons. The building is being constructed by day work, with Mr. Leggs as superintendent, from plans prepared by H. Staveley, architect.

The Florence proprietor is also increasing his accommodation by the addition of a 5th storey to the north wing of his establishment. Mr. Trudel, we believe, always acts as his own architect.

## PERSONAL.

Mr. F. H. Berlinguet, architect, Quebec, left that city for Europe, on the 11th inst.

Ald. Hanley, a leading contractor of Belleville, Ont., paid the ARCHITECT AND BUILDER a visit a few days ago.

Mr. Henry J. Powell, architect, of Tilbury Centre, has succeeded to the practice of the late Mr. J. R. Kilburn, of Stratford.

Mr. M. Demers, a popular contractor of Montreal, was presented by his friends a few evenings ago with a gold watch and chain.

Mr. D. B. Dick, architect, Toronto, will give an annual prize for proficiency in the first year to students in the architectural course at the School of Practical Science.

The CANADIAN ARCHITECT AND BUILDER was recently favored with a visit from two of the oldest and most esteemed contractors of Hamilton, Ont., Mr. John Webb and Alderman Hancock.

The CANADIAN ARCHITECT AND BUILDER desires to extend to Mr. Theo. Daoust, architect, Montreal, hearty congratulations in view of the matrimonial contract into which he recently entered.

Messrs. Darling & Curry, architects, Toronto, have recently taken into partnership Messrs. Sproatt & Pearson, also of that city. The firm name has been changed to Darling, Curry, Sproatt & Pearson. Extensive additions, alterations and improvements are being made to Darling & Curry's offices in the Mail Building, to meet the requirements of the new firm. Every modern contrivance calculated to systematize and facilitate operations will be utilized in the new offices, which, when completed, will be second to none in the Dominion.

## TORONTO ARCHITECTURAL SKETCH CLUB.

THE members listened to a paper of unusual interest on Tuesday, 24th inst., given by Mr. G. A. Reid, R.C.A. The subject was "Architecture from an Artist's Standpoint." Mr. Reid showed his appreciation of architecture by the many clever points made during the course of the evening, his numerous sketches in oils and pastelle bringing the subject before his audience in a very lucid and pleasing way. It is intended to publish the paper in full in the CANADIAN ARCHITECT AND BUILDER for April, illustrated by pen and ink drawings by Mr. F. S. Challener from the original sketches.

An interesting discussion followed the paper, in which Messrs. Darling, Sam Jones, Curry, Simpson, Gregg and others took part.

The competitive drawings for "A Stone Mantel" were then criticized by Mr. Frank Darling in his usual facile manner, Mr. E. B. Jarvis being awarded first place in the senior division, and Mr. Ernest Rolph first place in the junior division.

It is a fact for congratulation to the Club that it has to a large extent the co-operation of the architects in its work, and especially so that a number of the younger architects enter the competitions. It is hoped in time that more will be induced to go in

for them, as it is one of the primary objects of the Club that this should be so. The impression that the competitions ought to be restricted to draughtsmen and students is entirely erroneous and utterly incompatible with the feeling of the constitution.

At this meeting it was resolved by a majority vote of those present that the regular meetings should be held on Monday instead of Tuesday as heretofore, and in accordance with this, the next meeting was held on Monday, 9th inst. Mr. W. A. Langton gave a clever paper on "Richardson and His Works," which was listened to attentively by all present. At the close quite a lively discussion took place. As Mr. Langton spent a number of years in Mr. Richardson's office in Boston, he was well prepared to speak on the subject, and did so in a most interesting manner, receiving a hearty vote of thanks for his trouble.

## OUR ILLUSTRATIONS.

"CANADIAN ARCHITECT AND BUILDER" COMPETITION FOR A CITY HOUSE—DESIGN SUBMITTED BY "HIS ASPIRANT" (MR. MURRAY WHITE.)

The basement walls to be carried up to ground line in good rubble masonry, composed of the best quality of an approved stone, well bonded, laid in the best prepared mortar, and the joints, both inside and outside, to be struck with the trowel. The stonework above ground line to be of the best approved local stone, built in courses, to be neatly pointed and well bonded. The sill and head courses to be neatly tooth chiselled. Brick walls in basement to be built of hard clinker bricks. The walls from the stonework up to the first floor joists to be built of the best selected red bricks of a uniform color, laid English bond in mortar, stained in dark brown. Above ground floor the exterior walls are to be composed of 4 in. studding, shaded both sides with matched sheeting, and lined on inside before battering with a double thickness of sheathing paper. When parts are to be tiled, the best approved tiles are to be used, of a rich, dark red color; the gables to be lathed and plastered, one coat to go entirely over surface before strips are nailed on; plaster to be stained a dark brown color. The lumber throughout to be of good clear pine, and flooring to be selected free from knots, etc. The hall, dining room and parlor to be finished in black ash, oiled and varnished; the rest of interior finish to be of clear pine, stained and oiled.

TORONTO ARCHITECTURAL SKETCH CLUB COMPETITION FOR STONE MANTEL—DESIGN BY MR. EDGAR B. JARVIS, AWARDED FIRST POSITION.

SCHOOL HOUSE AND ASSEMBLY HALL AT THE BOYS' INDUSTRIAL SCHOOL, MIMICO—HENRY SIMPSON, ARCHITECT, TORONTO.

PLANS, ETC., IN CANADIAN ARCHITECT AND BUILDER COMPETITION FOR BILL OF QUANTITIES.

## THE R. C. A. EXHIBITION.

THE Royal Canadian Academy exhibition has attracted considerable attention, and copious comments and criticisms have appeared in the daily papers with atrocious attempts at illustration. The anticipations formed by the reading of some of these criticisms are rudely shocked in many cases when the spectator finally reaches the gallery and sees for himself. One cannot help feeling that their remarks are in some cases tempered by personal or other interests. It would be refreshing to have an estimate of the exhibition as a whole and a critique of the individual efforts from some authority, unbiased and competent.

The architectural exhibit is snugly ensconced in the Secretary's den, and modestly greets the persistent seeker after architectural art. It is well that it is thus enshrined, as the baker's dozen representing our glorious art would be hopelessly lost were it placed in one of the larger rooms.

We must confess to a feeling of real disappointment when we finally reached the sanctum. The sketches of a residence on St. George street by Mr. Townsend, two designs for churches by Messrs. Strickland & Symons, and a view in Ghent, Belgium, by Mr. Andrew Taylor, were the only numbers which could be singled out as even fairly rendered. Mr. Taylor's design for a residence had the fault of being stiffly inked in before being colored; his Branch Bank of Montreal did not err in this respect, but lacked all attempts at light and shade. Mr. Storm's perspective of the new Victoria College is somewhat effective when viewed at a distance, but coarse and rough when studied near enough to take in the design. The rendering of two houses by Messrs. Gordon & Helliwell and Mr. Taylor's Technical College Building is scratchy and devoid of light and shade. On the whole one cannot help feeling that there is a want of imagination betrayed by the majority of the exhibitors, and that many old friends are still playing on the same string as of yore—their trees, their rocks, waves and beaches, their homely human beings are the same old acquaintances.

The finer kind of coal ashes from domestic fires make excellent cement when used with common lime, the cement being four or five times as strong as common mortar. Those from steam boilers seem to be of sand in ordinary lime mortar made at too high a temperature for this, but can be used in ware.



## ERRATA.

TORONTO, Feb. 25th, 1891.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—I congratulate you on the expedition shown by your staff in turning out so rapidly your February number, notwithstanding the large mass of extra matter; and as stenographer of the Convention, I am delighted with the accuracy with which your compositors have done their work. However, as architects are noted for accuracy in detail, it is due to them that you allow me to correct two small errors. One is the insertion on page 17, line 6, of the name of Mr. Gambier-Bousfield as speaker. Remarks attributed to him should form a continuation of Mr. Gouinlock's. The other error is a very slight one on page 21. In the middle of my remarks, the word *Burring* would no doubt puzzle your readers, who know no one of that name. The word should be *Bunn-y*. This is a case of the compositor "taking the bun," and thus spoiling the pun.

Fraternally,

THOS. BENGOUGH.

## WORKS OF PALLADIO AND VIGNOLA.

MONTREAL, March 7th, 1891.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—In one of the works of Gwilt's "Rudiments of Architecture" there is a paragraph on page 120 which says "Palladio and Vignola the restorers of genuine architecture, are the authors whose works will be consulted with greatest advantage by those who desire to make any advance in the science, and most particularly by those who wish to obtain further knowledge on the use and abuse of its detail." Would you kindly give me the names of their principal works in the next number of the C. A. & B. and oblige,

Yours truly,

EUGENE PAYETTE.

[Palladio's four books translated by G. Leoni, 1726, or I. Ware, 1738, (both folios) will probably give our correspondent all he requires. They are, however, expensive. Both authors have produced valuable works on the "Five Orders of Architecture," a translation of one of Vignola's being called "The Regular Architect, or the General Rule of the Five Orders of Architecture," 1669. But most of these books are rare.—ED. C. A. & B.]

## COMPETITIONS.

QUEBEC, March 12th, 1891,

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—In the February number of your journal you published the following answers to certain questions from a Quebec correspondent: "The name of the author of a competition design should not be attached to his drawings, and when so attached, said drawing should be ruled out as being informal. It would manifestly be unfair to allow a signed drawing to remain in the competition and even more unjust to award to such a drawing a premium."

I am disposed to believe that in answering thus to your Quebec correspondent, you merely had a desire to express a personal opinion as to the way competitions ought to be carried out, and that in no way did you wish to impress upon your readers that there existed fixed and accepted rules for competition, and which were always followed.

With the majority of members of the profession I am of the opinion that it would be a good thing for us to have such rules, which would insure a uniform method of calling competitions and of judging them. But Mr. Editor, since there exists at present no such accepted and uniform rules, those calling a competition are quite free, it would seem, to draft anything they like or may think proper in the way of instructions to the competing architects. We cannot, therefore, and have not any fixed method to impose upon any one in this matter.

Supposing, for example, (a thing which is quite possible and even probable according to me) that the queries of your Quebec correspondent apply to a *real case*, and that the instructions issued to the competitors do not justify the answers as given by you, what then? Is not such a thing possible? I maintain that it is, and moreover, that the judge or judges in a competition are to be guided in their duty *solely by the instructions issued to the competitors* so far as the admission or putting aside of plans is concerned, and on the points on which a decision is to be given. We know of a competition for a certain public work, unfinished yet, and which has involved the expenditure of several millions, where the instructions to the competitors made no mention about using a motto or signing their plans: and the plans were all signed.

Now if similar instructions were issued in the case of your correspondent, and *one* of the competitors made use of a motto, does he thereby invalidate any or all other plans which may have been signed by their authors? If so, there would be risk sometimes of awarding first premium to the plan which least conformed to the needs contained in the instructions.

I've been a little long perhaps, but the question of competitions is an interesting and many sided one, on which there exists a number of different opinions among members of the profession, not only here in Canada but on the Continent also, as may be

seen by frequent correspondence and editorials in the professional journals from across the water.

I remain, yours truly,

AN ARCHITECT.

[The reply to our correspondent in February number was based on the supposition that the competitors were instructed to send in their designs under motto. If such was not the fact, the case is of course materially altered, and there would appear to be no reason to find fault because first place was given to a signed drawing. We have on several occasions outlined the rules which should govern competitions. The majority of the profession are probably in accord with them, as suggested in the above letter, and if they will abstain from entering competitions, the conditions of which their judgment cannot approve, they will greatly assist in bringing about the reforms which they profess to desire.—ED. C. A. & B.]

## A DIFFICULT PROBLEM.

QUEBEC, Feb., 1891.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—Encouraged by your kindly invitation to propound questions, the answers to which may be of scientific interest, and reminded by the locomotive boiler explosion, an engraving of which appears in the last number of the *Scientific American*, that I am still without an answer to a question I propounded at the time in relation to a similar occurrence in Quebec some years ago, I now beg to renew the query.

From what height must a portion of boiler plate (one quarter inch thick, some fifteen feet in area, and therefore weighing about 150 lbs.), torn from an exploded stationary steam boiler and launched into the air, have fallen to have been found by me standing upright in a log of white pine timber twenty-four inches square, into which it had penetrated to a depth of fourteen inches, almost exactly at right angles to the grain of the log.

The base of the parabola described by the missile did not exceed 100 feet. The ragged piece of plate had been blown out almost to a plane by the force of the explosion, and must have descended in an almost vertical direction, as that in which it would meet with the least resistance from the retarding atmosphere, or in a plane parallel to the falling leg of the parabola, whatever its position may have been in the ascending branch of the course.

If it be considered that a good man with all his might could hardly drive the sharp edge of an axe into a stick of timber, across the grain, to more than half an inch, it will be admitted that the blunt-edged piece of plate alluded to must have descended from an immense height, thus to imbed itself to such a depth as fourteen inches in a log of two feet in breadth.

This occurrence took place at Archer's steam mills at Sillery Cove, some five miles from the city, killing the engineer in charge; and it was on the occasion of my appearing before the coroner's jury that I visited the premises immediately after the accident.

C. BAILLAIRGE,

City Engineer, Quebec.

[It would be almost impossible to calculate the force necessary to make such a cut without making some experiments in order to form a sound basis for the calculation. However, some idea of the force may be formed in another way. We may assume that when the boiler exploded there was not less than eighty lbs. pressure shewn on the steam gauge. The sudden rupture of the boiler would permit its contents to escape into the atmosphere. Experiments in the flow of steam have shown that steam at eighty lbs. pressure will flow into the atmosphere through a safety valve at a rate equal to a velocity of 1,456 feet per second. This being the case, it is not unlikely that the piece of boiler plate started on its upward flight with an initial velocity not less than 1,000 feet per second. Leaving out of account the resistance of the air, a body projected vertically into the air at such a velocity would go up three miles before it stopped and began to fall. Again deducting the one-third for friction of the air while descending, the plate would strike the log with a velocity of nearly 550 feet per second. This velocity of a body of 150 pounds weight would be approximately represented by a pressure of 700,000 pounds on the surface of the log. The surface struck by the plate would be twenty-four inches by one-quarter inch, making six square inches, and the force of the blow would therefore have been about 116,600 lbs. per square inch, and we need not wonder that the log was cut to a depth of fourteen inches before all the energy was expended.—EDITOR C. A. & B.]

The Art Decorating Company has been formed at St. John's, Que., for the purpose of manufacturing the finer classes of clay goods.

The Richmond Slate Quarrying, Manufacturing and Asbestos Company has been incorporated at Richmond, Que., with a capital stock of \$150,000, for the purpose of quarrying and manufacturing roofing slate and products of slate, and of pottery, clay, asbestos and other minerals.

The Boyton Wall Plaster and Cement Manufacturing Co. of Kingston, has been incorporated with a capital stock of \$60,000. The promoters are James Minnes, E. A. Kirkpatrick, John Hewton, Robert L. F. Strathy, C. F. Gildersleeve, John Gaskin, Isaac Newlands, all of Kingston.

Incorporation is being sought for the Drummond McCall Pipe Foundry Co., of Montreal, to manufacture cast iron, gas, water, and other pipes. The applicants are: Geo. Drummond, James T. McCall, Thos. J. Drummond, Montreal; Thos. F. Griffin, Detroit; David H. Gilbert, Lachine.

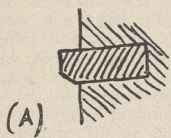


## COMPETITION FOR BILL OF QUANTITIES.

Following are the specifications accompanying annexed plans in the above competition:

## EXCAVATOR, MASON AND BRICKLAYER.

Excavate the ground as required for the cellars, and foundation of walls, chimney breasts, glazed pipe drains, etc. All vegetable mould to be put to one side for future use as directed. Fill in and ram and use the superfluous earth in terracing and leveling the lot, or cart away, as may be directed. The excavation to be 9" larger on all sides than the building, and no filling to be done till stone walls are plastered outside and inspected. The drains marked G. P. on plans to be executed with the best vitrified salt glazed pipe (Scotch or American), laid to proper fall as may be directed, jointed in cement, with all necessary bends, junctions and traps complete. Connect with sewer in street, contractor paying all fees. Put McGuire's cleaning out trap as shown, pipe from same to be carried to within 18" of surface and covered with stone flag. (All sewage drains inside of building will be of iron as per plumbers' specifications.) Lay 3" common tile weeping drains as shown properly graded and connected to main drains behind running traps as shown. Foundation walls to have footings of broad, flat stones 6" thick, projecting 4" on each side of wall above, and no stone to be less than half the total width of footing. The walls to be carried up to the height shown in good rubble masonry, composed of lake or other approved stone of the best quality, laid in the best prepared mortar, well built and bonded together, and having the joints on each side neatly struck with the trowel; the portion showing above ground and where lined is to be of brown Credit Valley stone in courses, neatly tape pointed in brown mortar, and having one bonder to at least every superficial yard of wall. The jambs to be tooth chiselled and to show a narrow draft on outer face. Plaster or parge outside of foundation walls from footings to finished ground line with  $\frac{1}{2}$  Portland cement mortar. None but hard bricks will be allowed on the premises. Brick walls in basement to be built of hard clinker bricks, with a neat struck joint. Build in all brick walls in basement a double course of roofing slate on top of footings 1" wider than wall to prevent rising of damp. Pier carrying front steps to be of hard clinker bricks on stone footings. The walls from underside of plinth to be carried up in brickwork of best hard, well-burned bricks laid in best prepared mortar. Projecting bays to be tied to main walls at every 5th course with stout hoop iron bond carried well into walls. Provide four (4) wrought iron straps 2" x  $\frac{1}{4}$ " to be forked and built into brickwork, and well spiked to studding of front where prepared for tiles. The walls to be faced with the very best selected Carlton or other equally approved red bricks, selected of dark color, true and straight, laid in English bond, and finished carefully with a bead tool joint in mortar colored with Cabot's or other equally approved dark brown mortar stain; bricks to be well wetted. On completion of gutters, thoroughly clean down with acid. Inside walls of back porch to be faced with white bricks finished with neat bead tool joint. Turn relieving arches of at least two rings over all openings of doors, windows, &c., and neat cut and pointed arches at openings as shown. Build in strips for battens at every 2 ft. in height in all outer walls and wherever else directed—strips to be provided by the carpenter. Beam fill on all walls to underside of floor and roof boarding, making all spaces thoroughly tight and weather proof. Turn proper arches over fire place openings on  $2\frac{1}{2}$ " x  $\frac{1}{2}$ " wro't iron camber bar, all flues to be formed circular 9" diameter, carefully built round moulds 3 ft. long, which are to be drawn up a few inches at a time as the work proceeds. Provide and build in proper galvanized iron collars to one flue in each room (except those having fire places). Flues not connected with fireplaces to have proper iron soot doors in iron frames. Form ash dumps from ground floor fireplaces as shown, having iron soot doors set in cast iron frames. Leave 9" x 12" opening into vent flue near ceiling of kitchen, and 7" diameter into same flue near ceiling of bath room. Chimneys to be carried up in brickwork of uniform color with projecting courses for caps. Bed in mortar all bond timbers, plates, etc., and build in all lintels, wood bricks, frames, cut stone and other work required to be set in masonry or brickwork. Support foot of iron soil pipes with 9" x 9" brick pier, three courses high. Form substratum of concrete floor with a 6" layer of clean broken stone chips, pounded flat and level. The entire cellar floor to be laid in concrete 3" thick, of Portland cement, sharp sand and coarse gravel in proper proportions, and all but laundry and back porch floated to a smooth surface with a coating of Portland cement and sand  $\frac{1}{2}$ " thick. Laundry and porch joists will be bedded in concrete. All hearths to have 4" brick trimmer arches and to be of concrete as specified for cellar floors. Finished hearths will be of tile provided by the proprietor. Brickwork to be built from outside scaffolding which is to be left for the use of other trades till directed to be removed by the architects, special care being taken to prevent walls being splashed from scaffolding. The labels and strings where shown to be one course of plinth brick, set thus: (A).

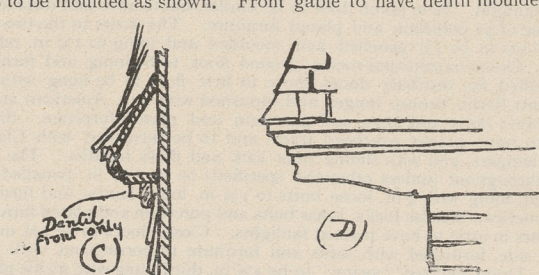
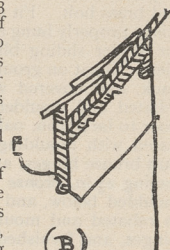


Provide and set sills of Credit Valley stone to basement windows, to be 6 in. x 9 in. and weathered; fuel doors will have wood sills. The sills to all other windows as tinted brown to be executed in the best quality of Portage Entry stone, or other approved brown stone, throated, chiselled, or rock faced, weathered and seated; rear sills may be of Ohio stone. Heads of fuel doors to be of brown stone 9 in. high. Head of entrance door to be of Portage Entry stone, 1 1/2 bricks thick, cross tooth chiselled. Corbels at front pilasters to be of similar stone similarly finished. Carefully set in fine mortar and protect with boarding till the completion of the work. Bricklayer to attend on other trades in the execution and for the perfect completion of the work.

## CARPENTER AND JOINER.

The lumber for the carpenters' work to be of good description of white pine thoroughly seasoned, free from sap, shakes, loose or large knots, or other imperfections, and to hold the full sizes shown or specified, when fixed in the building; good sound seasoned hemlock may be used for joists and rafters. The joiner's work (unless otherwise specified) to be of best description of white pine, clear and thoroughly seasoned. Inside work on ground and first floor will be varnished. Provide and fix all necessary centreings and tuning pieces to openings of doors and where required. Provide and fix lintels to all openings of doors and windows, cambered at top, and not less than 6" in depth at centre, and resting 6" on walls on each side. Provide strips 2 1/2" x 1 1/2" to be built into walls under bearings of joists and elsewhere as required for fixing skirtings, trimmings of doors, windows, etc., and other finishings, and at every 2 feet in height of outer walls, on which to nail battens. Batten all outer walls, (including attic where necessary) and elsewhere as required with 2" x 1 1/4" battens, at 16" centres—battens not to be placed till walls are parged. Porches will not be plastered. Provide proper grounds for fixing trimmings, etc. Cellar floor of laundry and porch to have 3" x 4" cedar joists bedded in concrete. Ground, first and attic floor joists to be 10" x 2" at 16" centres properly trimmed at fire places, wells of stairs, etc., trimmers to be 4" thick or double 2" and framed with double tenons. Put a tier of 2" x 2" herring bone strutting to each bearing of joists on

all floors. Prepare floors for pugging at gables where projecting beyond wall line with one inch boarding. Sloping roofs, 6" x 2" rafters at 16" centres, and valleys 8 in. x 3 in., plates 9 in. x 3 in., collars 6 in. x 2 in. at 16 in. centres. Ends of rafters to be dressed where visible. Sloping roofs to be laid with dressed  $\frac{3}{4}$  in. matched boarding in widths not exceeding 7 in., free from loose knots, shakes, or sap, well nailed. Put saddles behind chimneys boarded as roof and 3" rounded roll to ridges. Put dressed fascia and 1" beaded soffit to eaves, and bed moulding. (B) Gables to be 4" of studding at 18 in. centres, sheathed both sides with narrow matched stuff and lined on inside before battening with a double thickness of sheathing paper well lapped; batten as specified for other walls, sheet soffits with narrow, double beaded stuff matched on double sheathing paper made close and tight at walls, etc., and (C) form eaves and bed mouldings, as shown. Beams and corbels at side gable to be dressed and moulded as shown (D); casings to windows to be moulded as shown. Front gable to have dentil moulded large

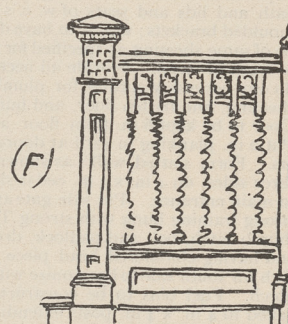


boards, as shown, (D) secured in strongest manner. Roof of rear porch to have dressed rafters, and 1 1/2 in. matched and beaded dressed roof boarding.

Partitions to have heads, sills and braces 4 in. x 3 in.; door studs 4 in. x 4 in., or double 4 in. x 2 in.; common studs 4 in. x 2 in., 16 in. centres, all to be properly framed and cross braced, those carrying joists or rafters to have heads 3 in. x 4 in., and upper studs to be carried down to them and to be well braced. Studs to be placed on flat in confined places. The ground and first floors to be laid with  $\frac{3}{4}$  in. dressed, tongued and grooved seasoned flooring of the best quality in boards not exceeding 3 1/2 in. in width, blind nailed to joists, and properly cleaned off on completion; attic and basement (where called for)

to be laid with  $\frac{3}{4}$  in. matched flooring of good quality, in boards not exceeding 5 in. in width, floors in attic to extend to wall line. Ground and first floors to be laid on thickened 1 in. boarding laid diagonally with a double thickness of carpet felt between. Carpenters not to lay any floors till all gas or other pipes are put in, and finished floors not to be laid till completion of plastering. Put mitred margins to hearths. Main stairs to be built on 1 1/4 in. moulded strings, 1 1/2 in. wall strings to have 1 1/2 in. treads, rounded and returned nosings, cavetto and fillet and cut brackets, 7/8 in. risers, two 7 in. panelled and moulded newels at foot, and the rest 5 in. turned and moulded cherry newels, 3 in. x 3 in. moulded cherry handrail with 2 in. roll, and 2 in. turned pine balusters. Stairs to be built on proper carriages, well bracketted with 1 in. brackets nailed to each carriage under each step. Spandril at side of stair and forming enclosure to coat closet of 1 1/2 in. framed and moulded panelling, all according to drawings; panelled door to closet under. End of stair facing entrance to have balustrade as shown. (F).

Back stairs to have 3 in. rounded hardwood rail, 4 in. hardwood newels, and square balusters, to have 1 1/2 in. treads, rounded and returned nosings and scotia 3/8 in. risers, put together in the best manner, with 1 1/2 in. wall strings. Stairs to cellar to have close strings, 2 in. treads, 3 in. rounded rail, 4 in. x 4 in. chamfered newels. The kitchen, back stairs and pantries to be sheathed with 3/4 in. matched and beaded sheeting 3 ft. high, and bath room 5 ft. high, blind nailed to proper grounds, and finished with moulded capping; boards not to exceed 4 in. in width, except in bath room, where they will not exceed 2 1/2 in. and to be double beaded or moulded. Drawing and dining rooms, hall, vestibule and staircase to have 10 in. double fascia moulded skirtings, and the rooms and hall on first floor 9 in. single fascia 3/4 in. thick, all properly scribed to floors and nailed to proper grounds. Nail fillet to floor at base. Base in attic 7 in. turns. Trim at registers and cut for plumbers, and hot air pipes. Put 7/8 in. staff beads to all projecting angles in kitchen and attic. Bracket down for plaster arches on ground floor and first floor, as shown by dotted lines, bracket down for cove in drawing room. The cellar windows (except where otherwise specified) to have 6 in. x 4 in. solid rebated and chamfered frames, 1 1/4 in. sash hung at top with 3 in. butts, and to be furnished with iron water-bars, 4 in. barrel bolts and hooks to hold them open. Cold air inlet to be protected with stout wire having 1/4 in. mesh and well secured. Fuel doors to have 2 in. oak sills, to be 1 1/4 in. panelled and prepared with stops for glazing, hung at top and furnished with hooks and 6 in. bolts. The whole of the windows above cellar (except where otherwise specified) to have proper boxed frames, 2 in. double sunk sills, outside hanging stiles, 1 1/4 in. moulded sashes hung with the best sash cord over the best iron axle pulleys. Front drawing room window to have boxed head, fixed fanlight, moulded transom as shown. Four (4) windows on front elevation to have 2 1/2 in. sashes with stops in preparation for plate glass. Windows to be fastened with approved fasteners of the value of \$4.50 per doz., and furnished with best bronze ring window lifts. Bed room windows, first floor, front elevation, to have simple moulded pilasters, sills, heads and transoms as shown, fanlights to be fixed and prepared with stops for lead glazing. Short window at first main stair landing, and that in linen closet, to have solid rebated frames, with stops for lead work. Windows in coat closet under main stairs, and side windows in attic to have casement sash with drip and water bar, properly hinged, to have knobs, and secured with brass





qolts. Dormers to be according to details and to have casement sash with drip and water bar, to be properly hung and fastened with spring catches and brass bolt. Fit to four windows in west elevation  $1\frac{3}{4}$  in. outside venetians properly hung and fastened. Prepare four windows in front elevation for Willer sliding blinds with all necessary stops, fillets, blocks, etc., complete. That on ground floor will be made to slide in pockets, behind window back, and covered with hinged flap. Entrance door to have 6 in. x 4 in. rebated and moulded frame, 2 in. staff bead, and 2 in. rounded oak sill, door to be  $2\frac{3}{4}$  in. oak veneered on outside, panelled and moulded and prepared with mouldings above for glazing, to be hung with three 5 in. loose butt bronze hinges, and furnished with hall door lock of the value of \$3, and having  $2\frac{1}{2}$  in. bronze knobs. Vestibule doors to be  $2\frac{3}{4}$  in. panelled and moulded below, and prepared with mouldings above for glass, doors hung in rebated and moulded jambs with three pairs of 4 in. loose butt bronze hinges, and furnished with 4 in. American rebate mortice locks, brass bolts, keys, bronze knobs and furniture, 9 in. bronze flush bolts. Back porch door to be  $1\frac{3}{4}$  panelled and bead flush, hung on 6 in. x 3 in. rebated and chamfered jambs, having 2 in. oak sill, to be properly hung and furnished with Carpenters' rim lock, white furniture and 8 in. barrel bolts, hinged and bolted fanlight. Side porch door to be similar, but to have hall door lock of the value of \$2 porcelain and plated furniture. The doors to the two principal floors to be  $1\frac{3}{4}$  panelled and moulded and hung to  $1\frac{3}{4}$  in. rebated jambs. Doors to principal rooms, ground floor, to be hung and furnished as specified for vestibule doors, those to first floor to be hung with 4 in. loose butt Berlin bronze hinges and furnished with 4 in. American mortise locks, brass bolts and keys, and porcelain and plated furniture. Sliding doors to have proper overhead track, and to be furnished with Clarke's patent hangers, and with sliding door lock and flush handles. The other doors throughout (unless otherwise specified) to be  $1\frac{3}{4}$  in. panelled and moulded, hung with 4 in. loose butts to  $1\frac{3}{4}$  in. loose jambs, and furnished with American mortise locks, brass bolts and porcelain and plated furniture, two doors in attic to have pivoted fanlights. Closet doors to be  $1\frac{3}{4}$  moulded one side, furnished with locks and furniture to correspond with other doors. Doors marked "swing" to be  $1\frac{3}{4}$  in. thick hung with nickel plated, Chicago spring hinges, and furnished with porcelain finger plates, both sides, and brass bolts. Opening marked "curtains" will not have doors but to be prepared for them, with rebated jambs, casings, etc. Doors in basement to be  $1\frac{3}{4}$  in. batten in  $1\frac{3}{4}$  in. jambs, having stops planted on, hung with 4 in. butts, and furnished with rim locks and mineral furniture. Architraves on ground floor main building to be  $5\frac{1}{2}$  in. double faced with band moulding. Architraves on first floor to be similar  $4\frac{1}{2}$  in. wide. Architraves in small rooms, passages, kitchen, attic, etc., to be 4 in. moulded with plain chamfered blocks. Put 2  $\frac{1}{2}$  in. picture mould at spring of cove in drawing room. Windows, except those to two principal rooms, ground floor, to have  $1\frac{1}{2}$  in. moulded window boards, bed moulds and moulded aprons. Windows of drawing and dining rooms to have panelled and moulded window backs. Front steps to have turned newels, moulded rail and balustrade as shown, treads to be  $1\frac{3}{4}$  in., and slatted. Kitchen pantry to be fitted up with six tiers of 1 in. dressed and beaded shelving supported on proper bearings. Fit up dressers in kitchen and service pantry, having  $1\frac{1}{4}$  in. panelled and moulded doors, properly hung and fastened,  $\frac{3}{8}$  in. beaded shelving—lower portion to be wider and to have drawers and cupboard doors below, having properly hinged and fastened doors, all according to detail; top of wider portion of dresser will be flush with top of sink, and to be of hardwood grooved for drainer. Bed room closets to have beaded shelves as shown, 5 in. beaded rail and strong bronzed metal hooks, 9 in. apart. Provide 30 feet of beaded rail with hooks 9 in. apart, to be placed where directed, also 100 feet of shelving on bearers, all in addition to that specified for closets. Hanging shelf in larder to be of  $1\frac{3}{4}$  in. stuff, suspended from ceiling with four  $\frac{1}{2}$  in. wrought iron rods. Fit up two tiers of  $1\frac{1}{4}$  in. shelving at each end of larder on proper supports. Linen closet to have wide shelves six in height, at ends, and enclose those at one end with hinged cedar fronts, fastened with spring catches. The steps in back porch to be of pine  $1\frac{3}{4}$  in. treads, 1 in. risers, 2 in. strings, rounded rail, bar balusters and chamfered newels. Fit up stands for kitchen and cellar sinks with hard wood capping. Do all necessary attendance and fitting for bath, basin and water closets (not including plumbers' work). Case plumbers' work where required with narrow sheeting hinged and bolted at front. The capping of bath and lids and seats of w. c.'s to be of cherry the latter supported on moulded brackets; w. c.'s to have double lids for slop sink. Front of bath to be of same sheeting as specified for room; panelled, hinged and bolted doors to front of basin. Provide all necessary boxing and beaded runs to pipes; do any necessary cutting for plumber. W. c. in cellar to be enclosed with sheeting, and batten door, and hung and furnished as other basement doors. Door to be kept 6 in. from floor and ceiling. Borrowed light as shown. Put 2 in. plank in yard at doorway, as shown on 4 in. x 4 in. cedar sleepers. Form slatted walks as shown with 2 in. x  $2\frac{1}{2}$  in. dressed stuff, dressed three sides, on 4 in. x 3 in. cedar sleepers; put rounded curb at edges of that to main entrance. Put side gate as shown formed with narrow pickets, and strong framing hung with strong T hinges and furnished with wrought iron thumb latch, bolt and padlock, dressed and rounded cedar posts, footed, and having chamfered head piece. Erect short piece of picket fence 6 feet high on south side to harmonize with gate, also a short piece on north side of porch. Fuel bins to be constructed of 2 in. horizontal planking, strongly nailed to 4 in. x 4 in. posts extending from floor to ceiling; the front to be made to slide in grooves for removal if necessary. Construct cold and fresh air ducts of dry 1 in. matched stuff with hinged valve, which will close inlet from floor when opening that from outside. Carpenter to attend on other trades in the execution and for the perfect completion of the work.

## SLATER.

Line valleys with galvanized iron 15 in. wide, increasing to 18 in. near foot. Joints to be soldered where in danger of snow backing up water, and to have 4 in. lap in other places. Cover ridges, etc., with No. 28 iron. Step and cloak flash against all walls, chimneys and checks and apron of dormer. Put strip of galvanized iron 5 in. wide, 3 in. on roof and 2 in. drip over back of gutter, well secured. Cover flat of cornice over three windows on first floor with galvanized iron, lapped, tacked and soldered, and turned up 6 in. behind tiling. Cover the sloping roof, including back porch and checks of dormer, with best quality of Canadian roofing slate from the Rockland quarries of about 20 in. x 11 in. size, and having double courses at eaves. Slates to be laid on heavy felt provided and laid by slater. All exposed portions of dormer to be carefully covered with felt well lapped. Cover east and south gables as shown with Dancy's, Ontario, or other equally approved tiles, of good rich, dark red color, well secured to walls, and laid on heavy felt, well lapped and tacked.

## TINSMITH.

Put 4 in. eave troughs of galvanized iron to eaves of back porch, and 5 in. do. to eaves of house of No. 28 gauge iron. Gutters to be stiffened with 7-16 in. x 7-16 in. wrot iron bars and well secured to rafters, and to have backs carried up to slates. Put three (3) stacks of 4 in. octagon down pipes to house and one 3 in. to back porch, all to be of the very best iron No. 28 gauge, approved brand, properly connected with gutters, secured to walls with iron holdfasts, and extending to surface of ground and there connected

with drain pipes with proper caps to pipes. Carry 3 in. down pipes from gutters on south gable to main eaves.

## PLUMBER AND GAS FITTER.

Lay on through house best tested iron piping, beginning with  $1\frac{1}{4}$  in. at meter, and connected with various points marked on plans with letters P for pendants and B for brackets, nipples left capped ready for fixtures. Pipes to diminish according to position to 1 in.,  $\frac{3}{4}$  in., and  $\frac{1}{2}$  in., all to be thoroughly tested. Drop lights to be taken out of the side of supplies and all supplies to brackets to rise from supply below, and in no case to drop from pipes overhead. Lay on separate supply from separate meter, to two fire-places on ground floor and to gas-stove in kitchen, beginning with  $\frac{3}{4}$  in. and diminishing to  $\frac{1}{2}$  in. Provide cocks with keys at fire-places. Lay on water to sinks, bath, basin and water closets with  $\frac{1}{2}$  in. 6 lbs. lead supply. Service from street line to line of branches to fixture to be  $\frac{3}{8}$  in. 8 lbs. lead. Provide hose connection at window of furnace room, with key cock, and provide stop and waste cock near floor. Put  $\frac{3}{4}$  in. brass stop and waste cock immediately inside wall of house, and all pipes to be graded to this point. Fit up in bath room best No. 14 gauge, tinned and planished copper bath 6 ft. long, with  $\frac{1}{2}$  in. 6 lbs. lead, hot and cold supply, and best heavy plated Fuller double bath cocks, plated rose and  $1\frac{1}{2}$  in. overflow,  $1\frac{1}{2}$  in. waste, Dubois trap, and brass trap screw, and plated plug and chain. Wash basin of best marbled earthenware, oval, and having Motts standing waste,  $1\frac{1}{4}$  in. counter sunk marble top, 1 in. back and end, 12 in. high, heavy plated Fuller cocks,  $\frac{1}{2}$  in. hot and cold lead supply and  $1\frac{1}{2}$  in. lead waste, Dubois trap and brass trap screw. Basin to be attached to marble top by means of brass clamps. Provide and fit up on first floor an all porcelain flushing rim wash-out closet, equal in value to the Inodoro or Unitas, with lead lined tank, having brackets, valves, supply, overflow, ball cock, &c., complete. Provide porcelain drip tray. Soil pipe to be 4 in. of cast iron carried from drain 2 feet beyond wall to 4 feet above roof at point of exit and to down pipes at surface of ground, to be coated both sides with cal tar and joints carefully caulked with oakum and lead. Dig for these pipes and replace earth properly leveled, and cart away surplus if any. Pipe to be of weight called for in city by law. Provide all necessary traps and hand-holes, with brass cleaning screws as shown. Foot of soil pipe will be supported on brick pier built by mason. Carry 2 in. cast iron waste from kitchen sink along ceiling of cellar to main soil pipe, supported on wrot iron hangers. Carry a 3 in. cast iron vent pipe from basement closet connecting to soil pipe above highest fixture (in bath room), and leave connections for vents from the various traps as required. The 4 in. soil pipe to be enlarged to 6 in. above roof line, and to have open mouthed top. Carefully flash on to roof with 16 oz. copper, into hub which must be kept clear of roof. W. c. in basement to be a flushing rim, cane ware wash out with 4 in. trap, syphon, cistern, etc., complete. Ventilate from seat to special flue in laundry with 3 in. galvanized iron pipe. Put a 7 in. diameter enameled valve register in vent flue near ceiling of bathroom. Put a 9 in. x 12 in. enameled valve register near ceiling of kitchen into vent flue. Ventilate drain by means of a 4 in. cast iron pipe connected to drain and carried 2  $\frac{1}{2}$  feet above finished ground line with return bend top. Put under bath and wash basin on first floor proper safes of 3 lbs. lead with  $\frac{3}{4}$  in. waste, with brass flap valve on the same emptying over kitchen sink. Carry proper safes under all pipes crossing ceilings. Safe under w. c. on first floor to be of marble,  $1\frac{1}{4}$  in. thick and counter sunk; put brass strainer on outlet of waste and connect to other safe wastes. Fit up in kitchen best galvanized iron sink 2 ft. 6 in. long, with brackets and enameled back and having  $1\frac{1}{2}$  in. heavy lead waste with Dubois trap, and brass trap screws and hot and cold supply of  $\frac{1}{2}$  in. lead pipe with brass Fuller cocks. Fit up in kitchen at back of stove on proper stand a heavy galvanized iron round topped cylinder of 40 gallons capacity, with  $\frac{3}{8}$  in. heavy lead hot and cold supply,  $\frac{3}{4}$  in. brass connections with stove in kitchen with shut-off cock; connect to stove with 1 in. iron pipe. Cylinder to have  $\frac{3}{4}$  in. sediment pipe and cock at bottom; also place  $\frac{3}{4}$  in. stop cock on supply pipe. Boiler to be supplied from pressure; provide combined safe and vacuum valve. Fit up small cast iron sink in cellar, having  $1\frac{1}{2}$  in. lead waste, trapped and supplied as other sink. Overflow pipe from basin and bath to be branched into dip of traps from same. Make all necessary Y branches for work as required, all waste pipes to have vents of  $1\frac{1}{2}$  in. and 2 in. lead pipe, carried into 3 in. pipe before mentioned. Vents for w. c.'s to be 3 in. diameter. Provide and fix from hall near head of main stairs to kitchen a proper tin speaking tube, with silver plated mouth pieces, etc., complete. All to be left complete and perfect in every particular. All work to be in conformity with city by laws.

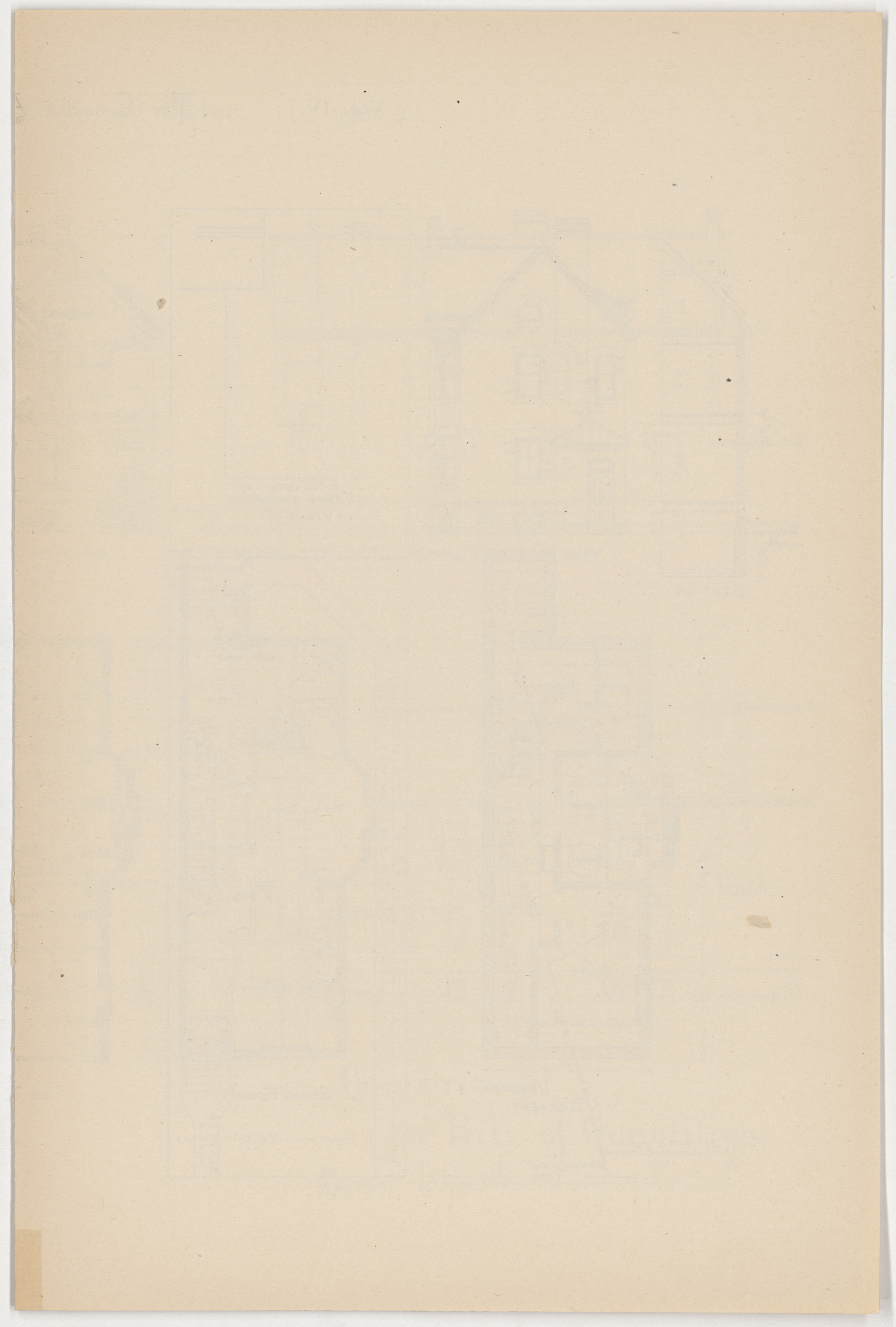
## PLASTERER.

Inner face of all outside walls, including attic, to be well rendered with best hair mortar after being built and before battening is executed, and make thoroughly tight also between all joists, etc., entering therein, also about all door and window frames. Floors at gable in attic to be deafened with mortar  $1\frac{1}{2}$  in. thick. Lath the partitions, ceilings, soffits of stairs and other places prepared for lathing, with the best sawn pine laths, 1 in. wide for ceilings and  $1\frac{1}{4}$  in. for walls, 5-16 in. apart, ends butt and joints broken every 18 in. Outer walls will be battened for lathing. Porch will not be plastered. Plastering to be of the best two coat work hard white finish. The ceilings of cellars throughout to have two coats hard white finish. The first coat of plaster in all cases to be continued behind skirtings, trimmings, etc. Form slightly rounded corners to all projecting angles to principal rooms and hall on ground and first floors. Simple cove in drawing room springing from wood-n picture mould. Plaster cornice in dining room to be 24 in. girth, in hall 20 in., and in vestibule 15 in. Put 2  $\frac{1}{2}$  ft. moulded centres to dining and drawing rooms, and 18 in. diameter to hall. Form simple moulded beams in ground and first floors as shown by dotted lines. Twice lime whiten walls of cellars. The whole to be executed with the best description of materials and workmanship, and to be left sound and perfect after making good after other trades. Plasterer to remove rubbish and broom out floors on completion. Leave woodwork clean and ready for painter.

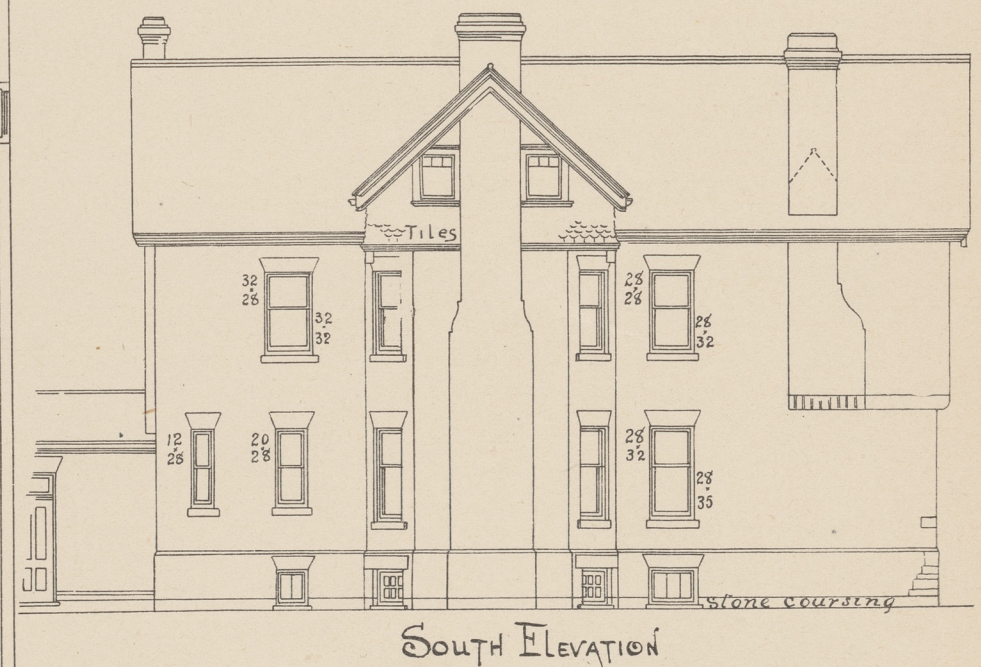
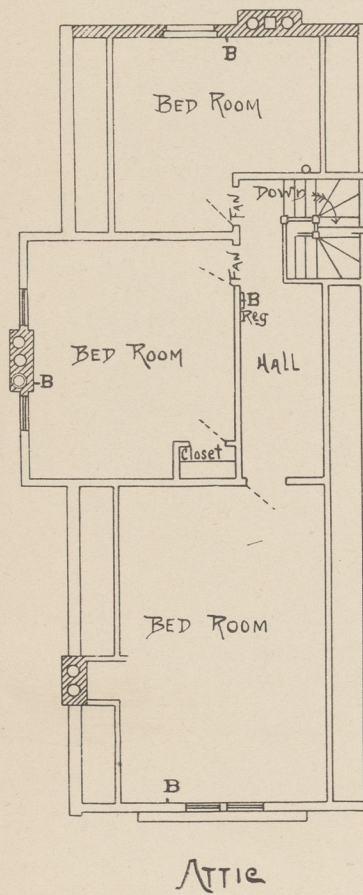
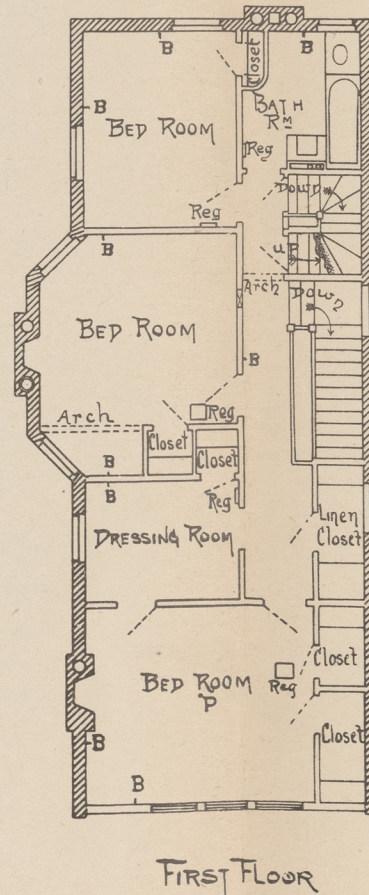
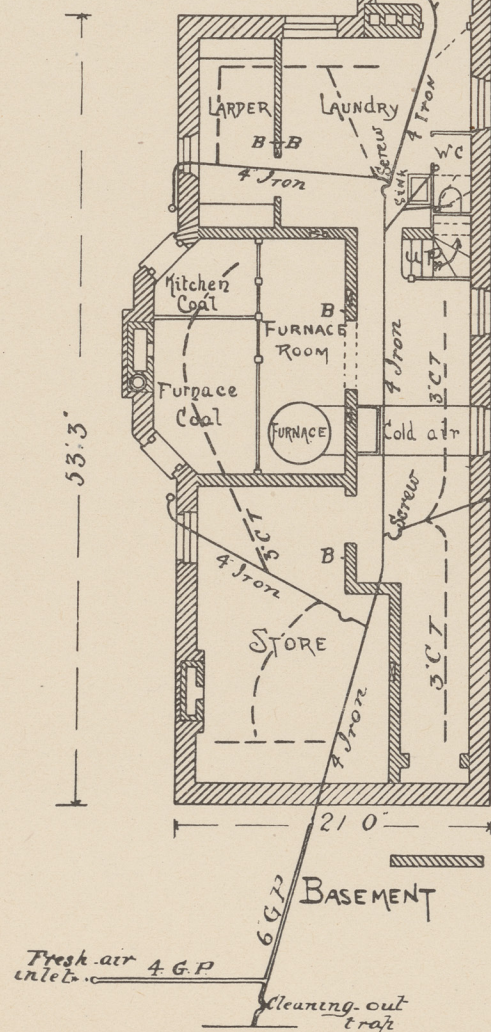
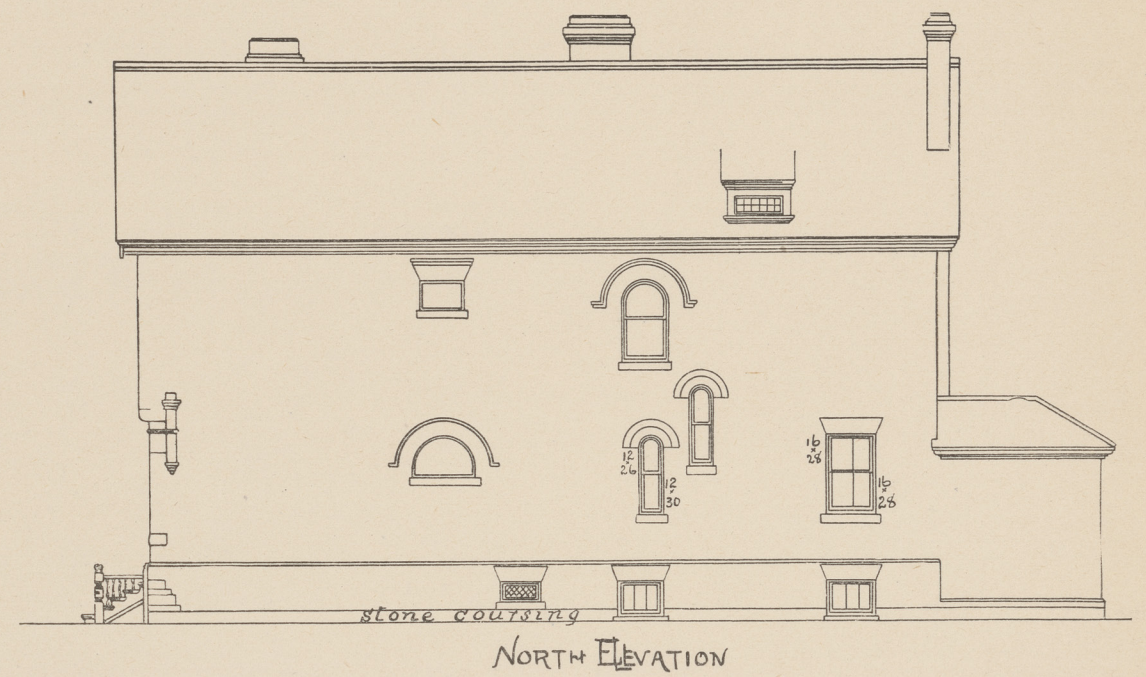
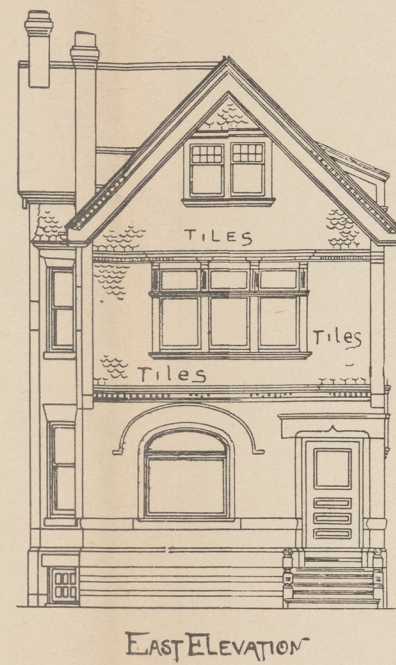
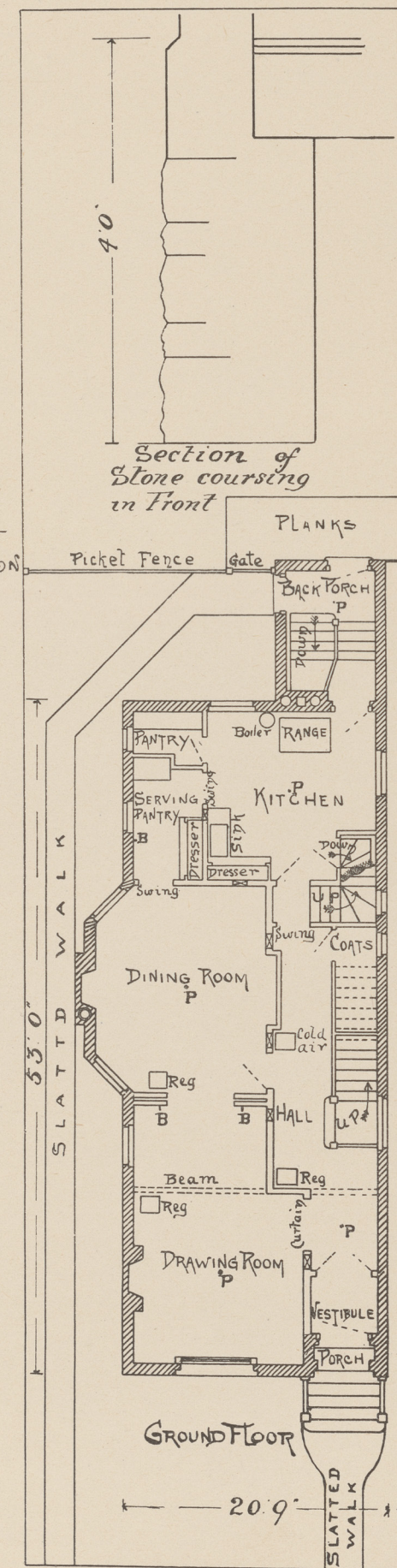
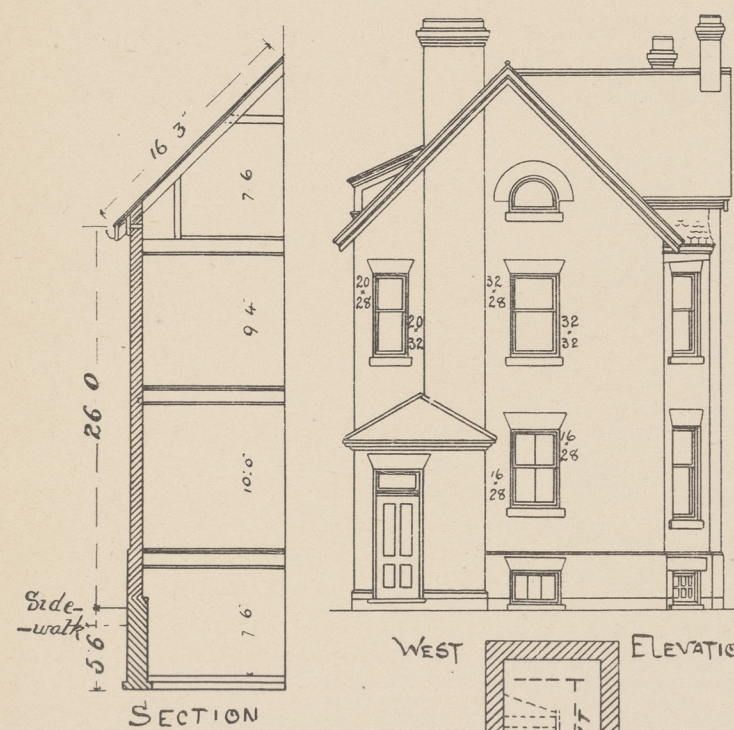
## PAINTER AND GLAZIER.

The whole of the internal and external dressed woodwork usually painted and except where otherwise specified, including outside steps and slatted walks, and dressed fence and gate to be painted three coats of white lead and linseed oil paint of approved tints. The work to be properly knotted and stopped, and well rubbed down after first and second coats. The woodwork of ground and first floors to be stained, oiled and twice varnished with best copal varnish. Treads and risers of main and back stairs to be stained and twice oiled. No inside blinds to be included in tender. Outside venetians to four rear windows to be painted three coats after priming. The visible galvanized iron work to be painted three coats. Except where otherwise specified, the whole at the windows and fanlights, glass doors, etc., to be glazed with double diamond star glass, selected free from flaws and defects, to be well puttied and back puttied, and bradded, the whole of the sashes to be primed before glazing. Glaze four windows on east elevation with  $\frac{1}{4}$  in. polished plate glass, and the small square lights of east windows in attic with rolled cathedral glass of selected tints. The glass in fuel doors to be  $\frac{1}{8}$  in. rough rolled plate secured with stops. Other glass in cellar to







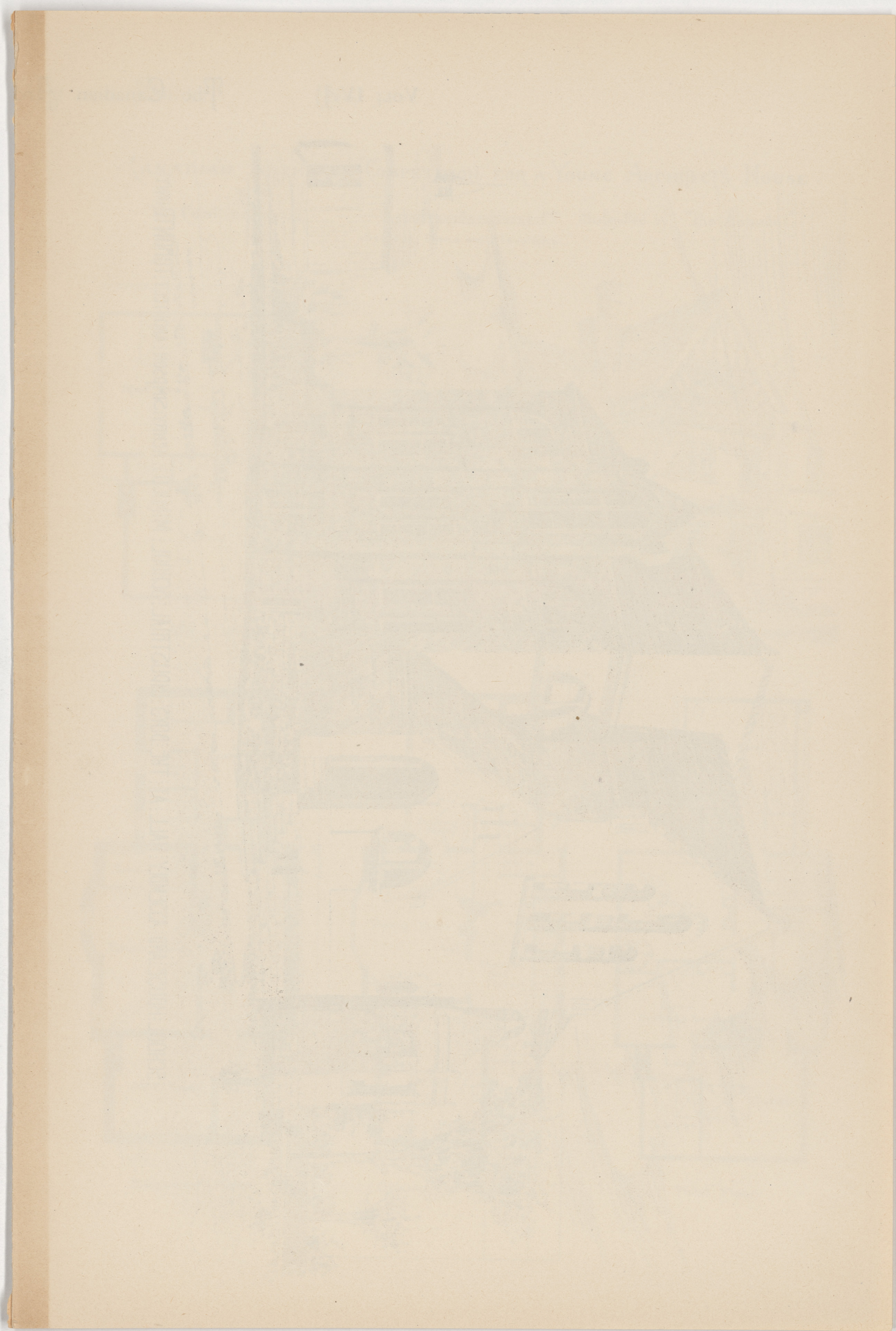


COMPETITION  
for Bill of Quantities  
Scale 0 5 10 20 30 40

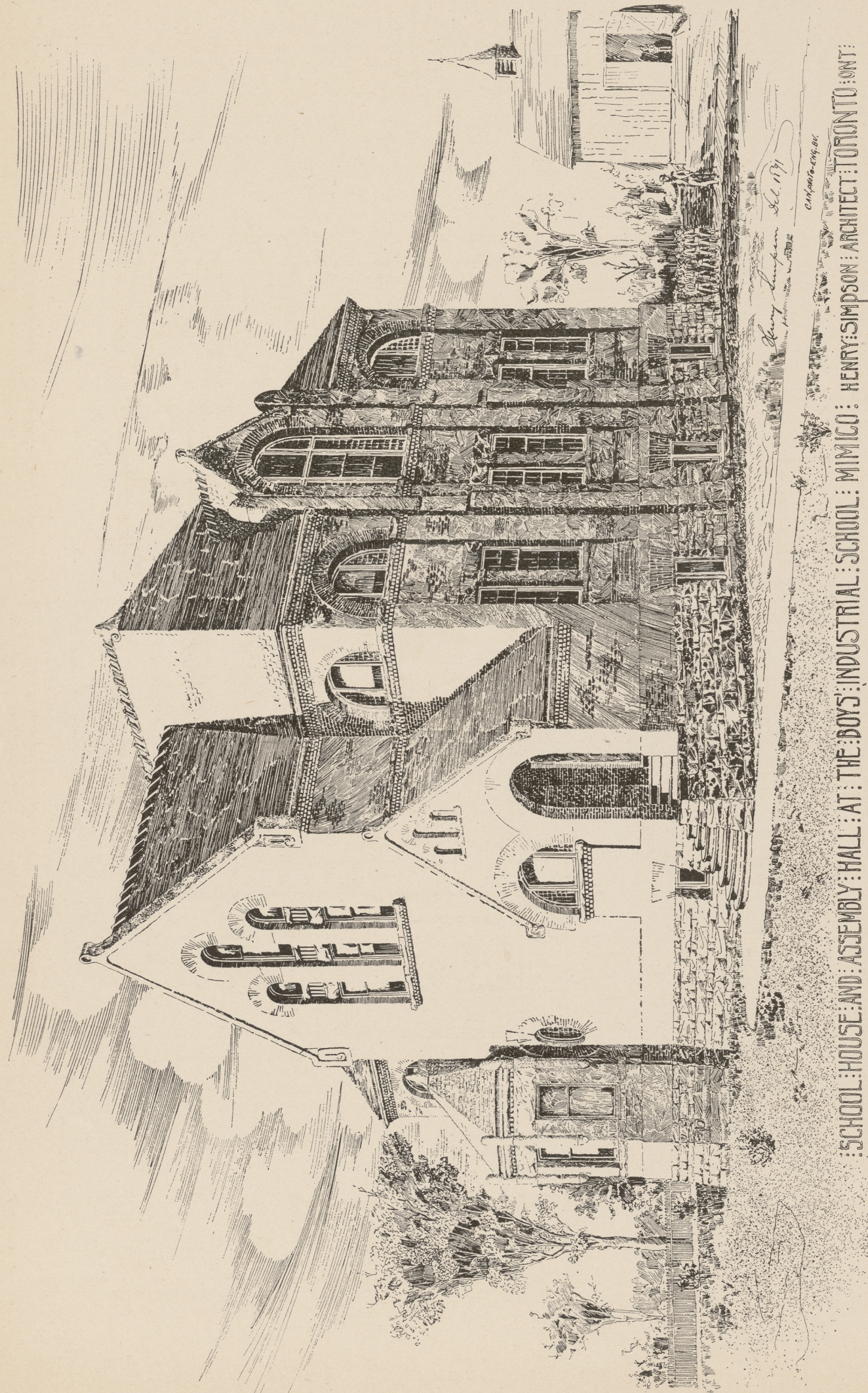


COMPETITION  
for Bill of Quantities  
Sole Proprietor







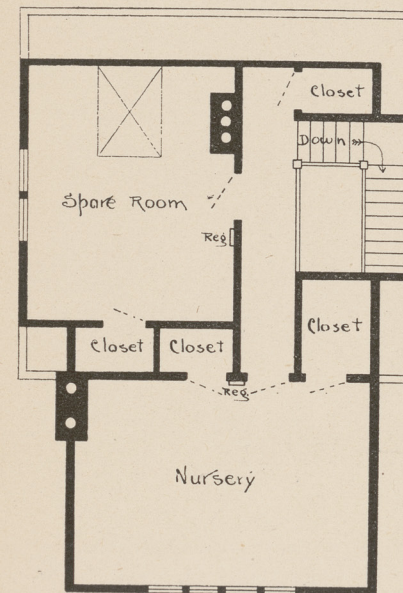


CANADIAN ARCHITECT COMPETITION FOR A YOUNG ARCHITECT'S HOUSE

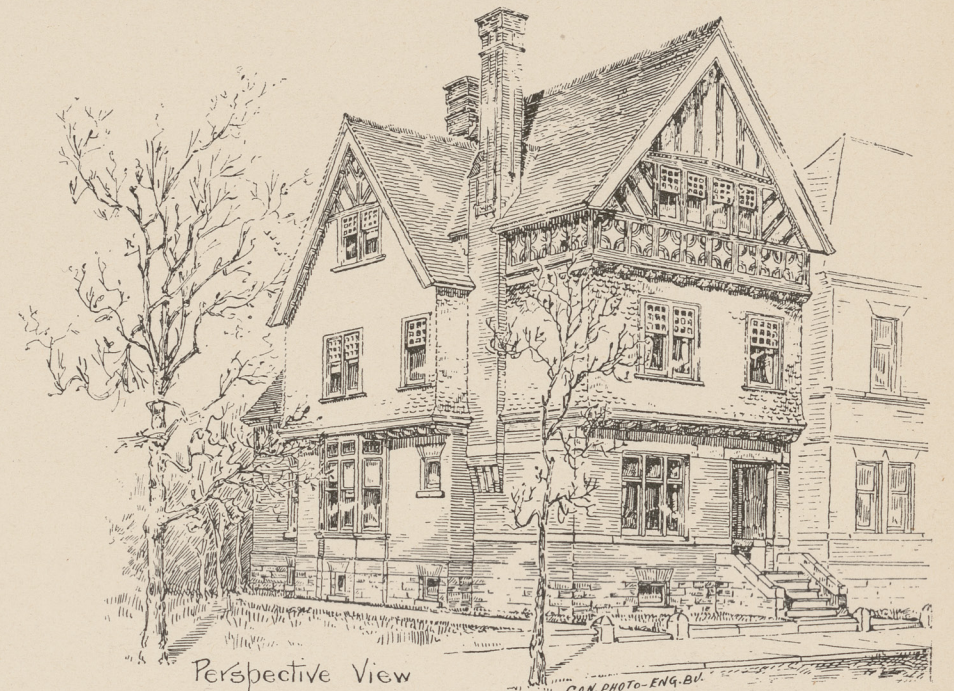
To Cost \$4000.00

Scale of Plans and Elevations

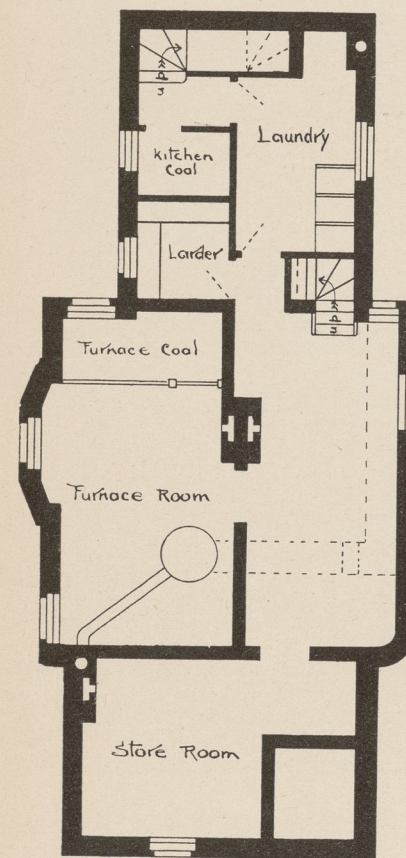
Submitted by "His Aspirant".



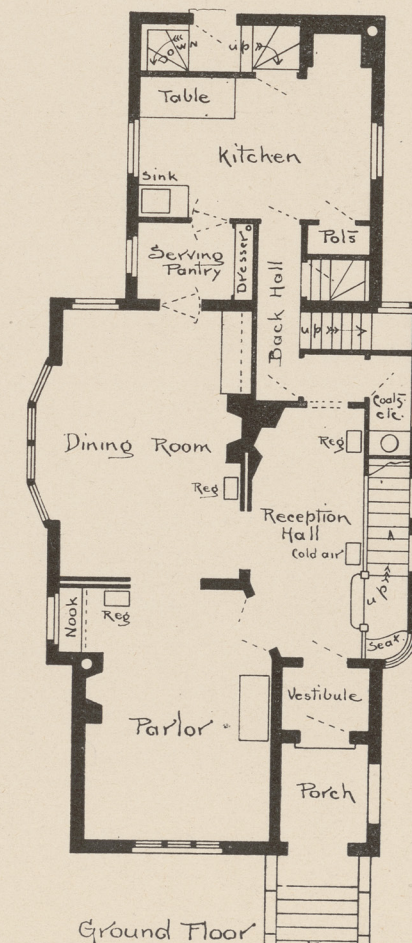
Attic Plan



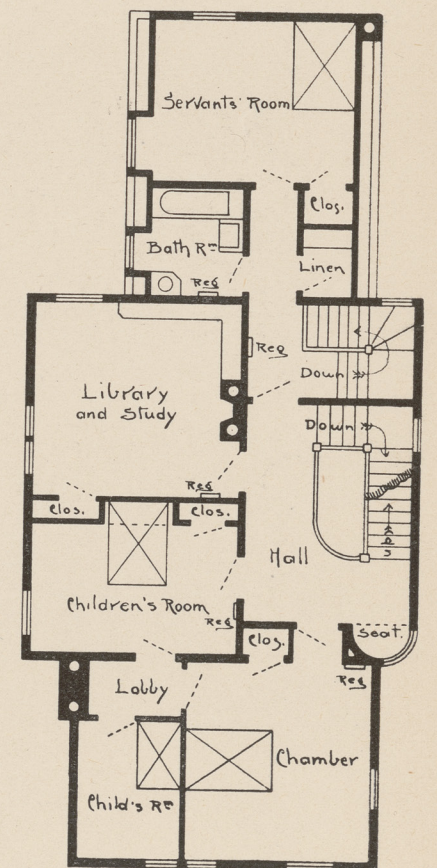
Perspective View



Basement Plan



Ground Floor

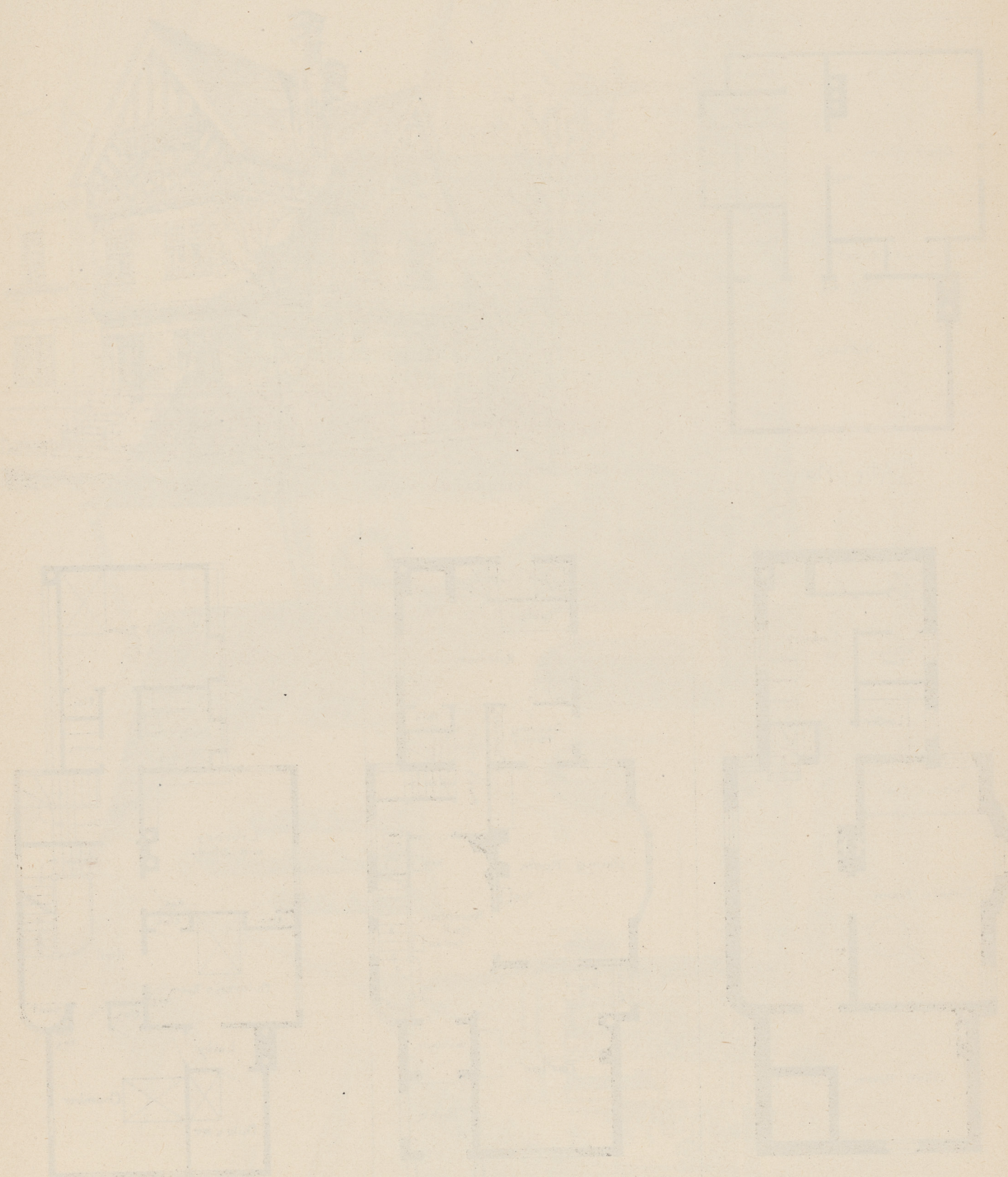


First Floor

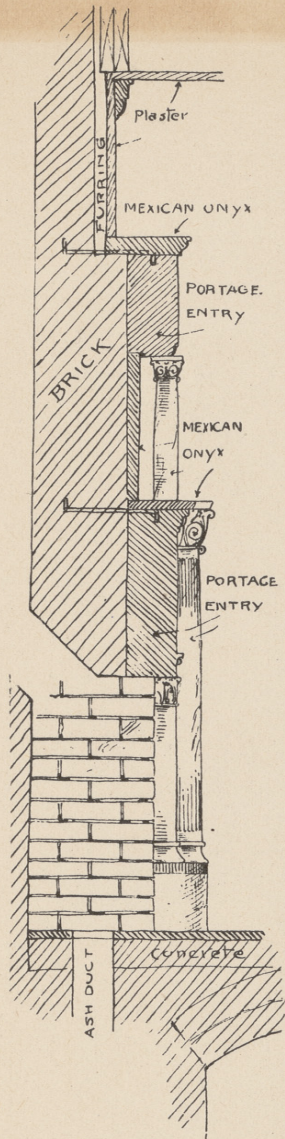


THE HOUSE OF THE FUTURE

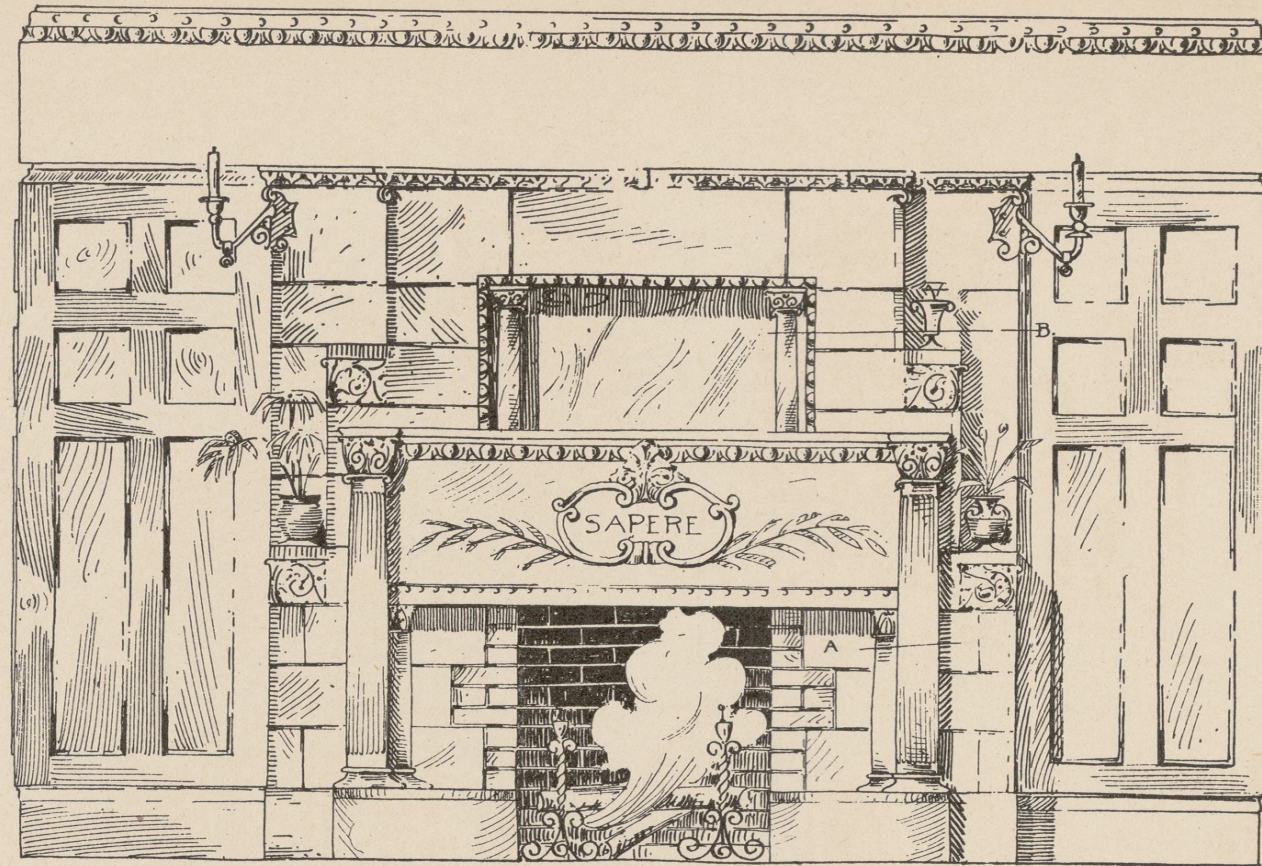
BY J. H. P. [illegible]



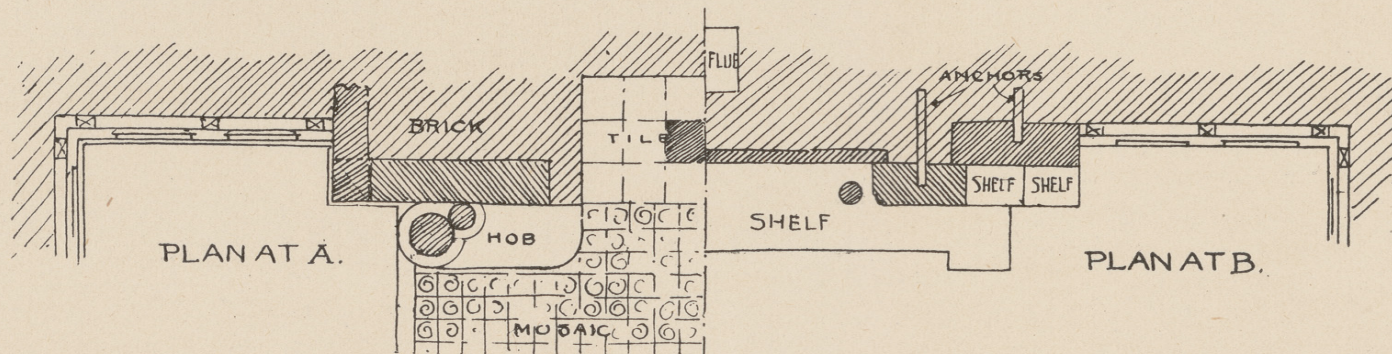




SECTION



CAN. PHOTO-ENG. BU.



PLAN AT A.

PLAN AT B.

END

TORONTO ARCHITECTURAL SKETCH CLUB COMPETITION FOR "A STONE MANTEL."

DESIGN BY "ROCKY" (MR. E. B. JARVIS), AWARDED FIRST POSITION.







be diamond star. The two windows at staircase landings and fanlights of four windows in east elevation to be glazed with stained glass provided by proprietor. Glass in vestibule doors will be provided by proprietor. Glass in entrance door to  $\frac{3}{4}$  in. be polished plate, bevelled. Glass in fanlights as marked to be ground; glazed borrowed light in basement w. c. with ground diamond star glass. Clean windows, scrub floors before and after painting, and leave all clean and perfect on completion. Put in sashes when directed, and do any necessary re-glazing required.

### AN ACT TO INCORPORATE THE PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

WHEREAS it is deemed expedient for the better protection of the public interests in the erection of public and private buildings in the Province of Quebec, and in order to enable persons requiring professional aid in architecture, to distinguish between qualified and unqualified architects, and to ensure a standard of efficiency in the persons practising the profession of architecture in the Province, and for the furtherance and advancement of the art of architecture;

And whereas the persons hereinafter named have, by petition, set forth that it is desirable that they, together with such other persons as may be hereafter associated with them, be incorporated by the name of "The Province of Quebec Association of Architects," having for its object the acquirement and interchange of professional knowledge amongst its members, and more particularly the acquisition of that species of knowledge which shall promote the artistic, scientific, and practical efficiency of the profession of architecture; Therefore, Her Majesty, by and with the advice and consent of the Legislature of Quebec, enacts as follows:

1. This act may be cited as "The Province of Quebec Architects Act."

2. J. W. Hopkins, F. X. Berlinguet, Victor Roy, A. C. Hutchinson, A. F. Dunlop, A. Raza, A. T. Taylor, M. Perrault, J. F. Peachy, J. Nelson, W. E. Doran, C. Clift, Chas. Baillarge, W. T. Thomas, W. McLea Walbank, Jos. Venne, A. J. Pageau, S. Lesage, J. A. Proudfoot Bulman, J. Z. Gauthier, J. Y. Resther, Theo. Daoust, G. E. Tanguay, D. Ouellet, J. H. Bernard, J. Wright, L. R. Monbriant, G. G. Languedoc, J. A. Chausse, R. Findlay, A. Gendron, L. C. Ernest Page, H. Staveley, J. B. Resther, J. J. Brown, W. H. Hodgson, J. H. Bonel, A. F. Fowler, E. C. Hopkins, Eric Mann, and all other persons who may be hereafter associated with them, shall be, and are hereby constituted a body politic and corporate, under the name of "The Province of Quebec Association of Architects" hereinafter referred to as the "Association."

3. The said Association shall have power:

1. To acquire and hold all lands and property necessary and required, in order to carry out the objects and purposes for which incorporation is sought, provided that the annual value of the real estate, held at one time for the actual use of the Association, shall not exceed five thousand dollars; and the said Association shall also have power to sue and be sued, and implead in their corporate name;

(2). To make and pass by-laws in accordance with this Act, for the direction and management of the Association; the admission to the study and practice of the profession of architecture, and all rules that may be deemed necessary for the maintenance of the dignity and honor of the said profession, and alter or amend the same when deemed advisable.

4. The head office of the Association shall be in the city of Montreal.

5. The said Association shall be governed by a Council, hereinafter referred to as the "Council," consisting of a president, two vice-presidents, a secretary, treasurer, and six members, all of whom shall be members of the Association, and shall be elected annually in the manner provided for in the by-laws of the Association.

The first Council to consist of the first eleven persons named in the first section of this Act; and they shall hold office until their successors are elected.

6. The said Council shall meet at the city of Montreal, within one month after the incorporation of the Association, for the purpose of organization.

They shall make such by-laws as may be necessary for the government of the Association, subject to ratification at the first annual meeting of the Association.

7. The Council shall, through their secretary, give notice in the Quebec Official Gazette of the completion of its organization; whereupon any person practising the profession of architecture within the Province, on the coming into force of this Act, may become a member of the Association by causing his name to be registered with the secretary of the Association within six months after such notice, and by paying to the secretary such fees as may, by by-law or otherwise, be made payable in that behalf.

In case any such person, as aforesaid, omits to be registered within the said period of six months, through absence, illness or inadvertence, such person may, at the discretion of the Council, be admitted to enrollment as an architect.

The Council may also admit to membership all members of associations of architects in the sister provinces, also members of the Royal Institute of British Architects, and of foreign associations of architects of equal standing on their presenting their credentials.

Architects not members of these associations, who shall have practised for five years, shall be admitted without serving as students, but shall be required to pass the final examinations.

8. Any other person who applies for admission to registration as an architect, after the coming into force of this Act, shall not be less than twenty-one years of age, and shall have served as a student not less than four years with a principal or principals entitled to register under this Act, or with any other principal or principals approved by the Council, and have passed such qualifying examinations as may be required by the by-laws of the Association except in the cases provided for by this Act.

9. The Council shall admit, as students or associates, those desirous of entering the profession of architecture.

Candidates must give one month's notice to the secretary, giving their full names.

They shall pay such fees and submit to such examinations as shall be necessary in that behalf.

Graduates in arts or sciences of any university in Her Majesty's Dominion, or of the Polytechnic School of Montreal, shall not be required, however, to pass any preliminary examinations; provided that any person who, before the passing of this Act, was entered as a student for a shorter term than five years, but not less than three years, with a principal or principals approved by the Council, shall, on serving the full time of his indenture and passing the examinations prescribed by the Council, be entitled to register under this Act.

Notice and evidence of existing studentship shall be given to the secretary within six months after the passing of this Act, and shall be accompanied with such fee as the Council shall, from time to time, direct, and with proper certificate of such studentship.

Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture to a registered architect, which indenture and any assignment thereof with affidavit of execution thereto attached, shall be filed with the secretary upon payment of such fee as the Council may by regulation direct.

The Council may shorten the period of studentship to a term, however, or not less than three years in favor of graduates of any recognized college or school of architecture or technology.

The Council shall admit after sufficient examination every graduate of a recognized school of architecture or technology after one year's study under a principal approved by the Council, provided the course of studies followed by such candidate shall have been not less than four years.

10. The Council shall appoint an examiner or examiners for the purpose of ascertaining and reporting on the qualification of all persons who shall present themselves for admission to the study or practice of architecture.

The Council shall also prescribe the subjects for such examinations which shall take place in January and July on the days previously fixed and advertised by the Council.

11. The Council shall fix a tariff for the services of members which, when approved of by the Lieutenant-Governor in Council, and published in the Official Gazette, shall be accepted in all courts of law as evidence of the value of such services, except there be an agreement in writing.

12. The time and place of the annual meeting of the Association and of special meetings thereof, and for meetings of the Council, shall be fixed by by-laws, also the mode of summoning and conducting the same.

In the absence of any rule or regulation as to the summoning of meetings of the Association or of the Council, it shall be lawful for the president, or in the event of his absence or death, for the secretary to summon the same at such time and place as to such officer seems fit, by circular letter to be mailed to each member.

13. From and after the first day of July, 1891, no person shall be entitled to take or use the name or title of "Registered Architect," either alone or in combination with any other word or words, or any name, title or description implying that he is registered under this Act unless he be so registered. Any person who, after the above date, not being registered under this Act, takes or uses any such name, title or description as aforesaid, shall be liable on summary conviction, to a fine not exceeding \$25.00 for the first offence and not exceeding \$100.00 for each subsequent offence.

14. The secretary shall, in every year, cause to be printed, published and kept for inspection at his office free of charge, under the direction of the Council, a correct register of the names in alphabetical order according to the surnames, with the respective residence in the form set forth in schedule "A" to this Act or to the like effect, of all persons appearing on the general register on the first day of January in every year, and such register shall be called the "Architects' Register," and a copy of such register for the time being, purporting to be so printed and published as aforesaid, shall be prima facie evidence in all courts and before all justices of the peace, and others, that the persons therein specified are registered according to the provisions of this Act; provided always that in case of any person whose name does not appear in such copy under the hand of the secretary, the entry of the name of such person in this register shall be evidence that such person is registered under the provisions of this Act.

The secretary shall keep a similar register of student associates.

15. Members and student associates shall pay on such registration an annual fee as shall be required by the by-laws.

The names of those in default shall be removed from the respective registers by the secretary, after one month's notice to the parties, and shall not be re-instated except upon the payment of all arrears and such fine (if any) as may be imposed by the by-laws of the Association.

16. The Council may direct that a name be removed from the register in the following cases, (that is to say) at the request or with the written consent of the person whose name is to be removed, or where the name has been incorrectly entered, or where a person registered has, after the passing of this Act, been convicted either in Her Majesty's dominions or elsewhere, of an offence which, if committed in Her Majesty's dominions, would be a misdemeanor or higher offence, or where a person registered is shown to have been guilty after his registration and either in Her Majesty's dominions or elsewhere, of any conduct or breach of the by-laws orders or regulations of "The Province of Quebec Association of Architects" or of conduct infamous in a professional respect.

When the Council shall have removed the name of any person from the register, the name of that person shall not be again entered upon the register, except by a resolution of the Council or by an order of a court of competent jurisdiction.

The Council may, by resolution, direct the secretary to restore to the register any name removed therefrom either without fee or upon payment of such fee not exceeding the fees in arrears or unpaid, and one additional renewal fee as the Council may, from time to time, fix; and the secretary shall restore the name accordingly.

The name of any person removed from the register at the request of such person or with his consent, shall, unless it might, if not so removed, have been removed by order of the Council, be restored to the register, on his application and on payment of such fees not exceeding such fees as shall be in arrears, and one additional registration fee, as the Council from time to time, may fix.

In the event of removal or expulsion an appeal shall lie to the Association which, at a general meeting, may reverse the decision of the Council.

17. Subject to the other provisions of this Act all notices and documents required by or for the purpose of this Act to be sent, may be sent by post, and shall be deemed to have been received at the time when the letter containing the same would be delivered in the ordinary course of the mail; and in proving such sending, it shall be sufficient to prove that the letter containing the notices or documents was prepaid and properly addressed and registered and put in the post.

Such notices and documents may be in writing or in print, or partly in writing and partly in print, and when sent to the Council or other authorities, shall be deemed to be properly addressed, if addressed to the said bodies or authorities; or to some officer of the Council, or authority, at the principal place of business of the Council or authority, and when sent to a person registered under this Act, shall be deemed to be properly addressed, if addressed to him according to his address registered in the register of the Association.

18. All moneys arising from fees payable on registration or the annual renewal fees, or from the sale of copies of the register or otherwise, shall be paid to the secretary of the Council, and by him paid over to the treasurer, to be applied, in accordance with such regulations as may be made by the Council, for defraying the expenses of registration, and the other expenses of the execution of this Act, and subject thereto towards the support of museums, libraries or lectureships, or for other public purposes connected with the profession of architecture, or towards the promotion of learning and education in connection with architecture.

The Council shall have power to invest any sum not expended as above, in such securities as shall be approved by the Government of the Dominion of Canada or of the Province of Quebec, in the name of any three of their number appointed by the Association; and any income derived from such invested sums shall be added to and considered as part of the ordinary income of the Association.

The Association may also use surplus funds or invested capital for the







openings or other interruptions of the continuity of wall surface, rendering necessary a large quantity of heating surface in a small heater, caused several Canadian firms to encourage the invention and commence the manufacture of radiators for hot water heating. These have so far been of cast iron, several of the more recent being good circulators and inferior in efficiency to box coils, wall coils or circulations only. There are, however, wide differences in price and in results between the various kinds, the cheapest varieties, even though they may show the largest number of testimonials, not being necessarily the most scientifically constructed, and it behooves the architect to examine if possible their behavior, and to make a comparative test.

The wall coils (circulations) found most effective are 1 x 8 pipes or 1 x 6 pipes, although 2 x 8 and 2 x 6 are as frequently used owing to want of long reaches of uninterrupted wall. A number of 2 x 6 and 2 x 8 wall circulations in the Langevin block at Ottawa, have each 500 feet of 1" pipe, and several of the 1 x 8 have 300 feet. The best form so far used, is that sometimes called a trombone coil. Taking a 1 x 8 for example, we have at one end two 4-branch headers one above the other, the supply and four of the heating pipes connected to the upper, and the return and four pipes to the lower—the pipes of each series of four being parallel with each other, but the upper and lower series converging towards the distal end, where they unite by semi-circular connections which afford the minimum of friction. These afford a rapid circulation, and being widely distributed, ensure more rapid diffusion of heat than can be had from closely packed stacks and clusters of pipe, or from the more widely known radiator.

In a large number of cases box coils, wall coils and radiators were used in the same building, and the difference in rapidity of flow of water in these three species complicated the problem, and sometimes brought about unexpected results—e. g., of the risers, those to an upper floor, and of heaters, the wall coils, had the best circulation; and as the radiators (the slowest circulations) were usually situated on the ground floor, whence the water had less tendency than to the upper floors, the ground floor had two factors against a good circulation, while the upper floor had the willingness of the water to rise, and the advantage of the best circulating heaters in their favor.

A series of rules for computing quantities of heating surface proportionate to the given cubic contents, can be had in any of the books on heating, but in this climate, an architect soon learns to use them merely as a basis for departure. Conditions vary so much, that even if this paper were a general one, there would not be space enough for its general consideration; but the conditions in the case of one ordinary post office are so nearly those of another, that once a quantity is found productive of content in one, the same is used in the others. So far a proportion of five lineal feet of one inch pipe (1 1/2 square feet of heating surface) to each 100 cubic feet of space, has been found sufficient in rooms having but one side to the weather, provided the circulation be good. When two or more sides are exposed, the heating surface is increased 1% for every 2% in surface outside wall. Where wall coils or circulations not more than 8 pipes high and 1 pipe wide are used, a very considerable reduction in the quantity of heating surface is made. The glass surface formula usually given by Baldwin, Schumann and others, is also taken into consideration.

In open stairways a liberal allowance on the ground floor, very little on the first floor, and none on the attic, seems good practice. Corridors which do not abut on the outside wall require a very small amount of surface, not more than 1 ft. lineal of 1" pipe (1/2% of heating surface) per 100 cubic feet of air, a proportion which the best heating firms use. In churches and in hospital wards, double this quantity, always bearing in mind that these figures refer to a rapidly circulating plant.

The custom of carrying rising mains between studding in partitions and in chases cut in walls, was early abandoned in practice in public building. Pipes when carefully put up were found not unsightly, and the circulation better when in the room than in the walls. Moreover, they are more readily got at, and contribute a certain addition to the heating surface in the room.

The expansion tank used is an ordinary cylindrical one of galvanized iron, open to the atm. sphere. It has three connections—one from the bottom to the furnace, one from the top to the furnace room where it acts as a tell-tale when the fireman is careless enough to let the water in the apparatus boil, and one at the side to a feed tank. It is placed above all the coils, and should have, say, 1-26th or 1-28th of the contents of the apparatus, so as to have room for the amount gained by the water in expanding from the temperature of the supply to 180° or 200°.

The President: I am sure we are all deeply indebted to the authors of this elaborate paper.

Mr. Helliwell: I would like to move a vote of thanks for the paper we have just heard.

Mr. Symons: I have much pleasure in seconding that.

Mr. Gambier-Bousfield: This is a technical paper that I am sure we would all be delighted to study at leisure, in conjunction with the plans. I would therefore ask Mr. Billings if he would kindly leave the paper in the hands of the editor of the CANADIAN ARCHITECT AND BUILDER, who wishes to reproduce all these papers. I heartily concur in the vote of thanks.

Mr. Billings: I will be very happy to leave the paper. There must be architects in the west here who have had considerable experience in hot water heating. The Department of Public Works in Ottawa is the only one I know that gets up a full specification for heating. I understand that the Treasury Department at Washington supply blue plans—or at least white plans made by the same process—to the different firms who tender for heating.

Mr. Edwards: I am rather surprised that they find five feet of inch pipe to the hundred sufficient down in the colder section. In our practice we have for the lower flat eight, and, if very much exposed, ten feet to the hundred; for the upstairs we use six; and I have not found at any time that it has been at all extravagant in the abundance of pipe.

Mr. Bousfield: I understood Mr. Billings to have said that that would probably be the minimum, because his calculations were based upon a rapidly flowing system.

Mr. Billings: Oh, yes. If you have a large building and a cast-iron furnace you won't certainly produce anything of that kind. The great thing, of course, is to return as rapidly as possible. We use much larger furnaces than you use here—ordinary wrought-iron ones.

The vote of thanks was carried heartily.

Mr. Burke: How do you account for the tremendous difference in results in different buildings?

Mr. Billings: It is very often due to the amount of external

wall surface; there are other factors, but that is the chief. There are lots of problems to be worked out. The Montreal engineers experimented a great deal on the convents—those long, rambling buildings—and the difference between the old and new buildings of the Ville Marie Convent—one heated by steam and the other by hot water—was a saving in the latter of over thirty per cent., and very much better heat.

Mr. Burke: Do you use indirect heating in your system?

Mr. Billings: No; it is all direct. Indirect heating in a cold climate is no use. We can hardly leave it to the caretaker employed on a small building to ventilate the building.

Mr. Townsend: Is there any supply of air more than that which comes in by doors and windows?

Mr. Billings: No; but in the post office you don't want any more than comes in through the doors—that has been our great trouble; we have too much air in the day time. The air is all right at night when there is electric light; but where you have gas naturally you have bad air.

Mr. Curry: There are so many factors in the question of heating that it is a very difficult question to show which is the better plan by mere statement. As far as I can see, it is almost impossible to make a fair comparison as between systems; the question has not been solved, and will not be for some time. I think, all things considered, that you must get better value from your fuel passing through the steam boiler than through the hot water boiler. Your boiler is at a higher temperature, and is therefore more likely to burn the gases than in the hot water apparatus. In the latter, in ordinary circumstances, the temperature is not high enough to consume the gases fully, and you consequently must lose that amount of heat value. (Hear, hear). Then, again, if you burn the fuel and convey it to different parts of the building, why should the one be so much more economical than the other? I will admit that for small houses hot water is more serviceable. For large buildings it is a question that depends very largely on circumstances, and on the person putting in the apparatus. There is no doubt that in a small room with one radiator in it, steam is rather a nuisance unless it can be regulated in some way, and water is very much nicer to heat it; but again, you require such a large amount of hot water heating surface that it becomes in many cases a nuisance. You can't have a room full of coils; you want to put some furniture in. (Laughter.) What I would like to know is, what has been done in a fair spirit to find out the relative value of the two systems? This question of a man experimenting with a thing to prove what he believes is all a mistake—he generally does prove what he does believe; and so it goes on. Then again, as far as hot water heating is concerned, apparently the Department have not made any use of indirect heating. I think in this country hot water heating with an indirect system is almost impossible, unless you have a man up day and night who can watch the different dampers and close the heat here and there, and close off the air, and other things. It would be almost impossible to prevent occasional freezing of the pipes, and consequently repairs; whereas with steam it is possible to heat a building on an indirect system very comfortably—far ahead of hot water in my opinion, and with comparatively little care. It has been done, and has given great satisfaction; and what has been done can be done again. As to fuel, I know that indirect steam heating requires a large amount, as it necessarily must when you bring in fresh air and warm it up; but you have the advantage of fresh air, whereas with hot water it is the same thing as stoves, heating the old air over and over again, and the amount of air you generally get in from crevices—which generally comes in from the windward side, and is allowed to pass out of the building to the leeward side. What I would like to know is, whether the Department have made the attempt to find out by actual comparison the difference in the value of the heaters as manufactured here and also in the States; and also if they have made any test on a fair basis as between steam and hot water heating?

Mr. Billings: The trouble in following Mr. Curry is that he has gone into the whole question of heating. Before going into the matter, all the best plants in the Dominion had been carefully examined, and all the work previously done by the Department gone into; tables had been kept as to the consumption of coal, and so on. There is nothing against indirect heating with hot water any more than there is with steam. As to the results with coal, you don't get any results at all with steam until you get steam; whereas with hot water, the very minute the water is even a fraction of a degree over the temperature of the room, you are beginning to gain the heat; that is one of the points on which you can count. Excuse me if I don't recollect all the things you have said, Mr. Curry, (laughter) but it was a very wide speech. So far as the different kinds of radiators are concerned, they have been very carefully tested. We have seen the test of the different kinds, but of course we would not care to say anything about it here. As you say very rightly, wall circulations take up a great deal of room; but still, on the wall, where they are only one pipe wide, they are not so very much in the way. You can put a cap or moulding over them so that anything being pushed back won't strike them. I read in *Mechanics* of a very interesting test last winter in New Jersey, where they built two green-houses and put the same quantities of pipe in both. After laying the fire we find one great advantage in favor of hot water is, that we don't require to fire more than once every twelve hours; a man does not require



to run and see whether his fire is all right and his guage-cocks are all right; and if about the same heat is wanted it will go on all right without any trouble to anybody. In the test I referred to, the same quantity of pipe was used, and they got 26% in favor of hot water. That is the only test I have seen recorded. It seemed satisfactory enough, but still it would not be an answer to everything. I was not sure whether Mr. Curry said that you could leave steam heating apparatus and it would be perfectly safe at night.

Mr. Curry: I know there are two steam plants in this city which can be kept running eight hours without touching.

Mr. Edwards: That is low pressure steam?

Mr. Curry: Yes.

Mr. Billings: I have seen an apparatus in Ottawa run for eighteen hours, but of course a man couldn't do it every time.

Mr. Curry: It is not a rare thing to have our hot water radiators caught in exposed positions—vestibules, or where the pipes come up near outside walls—partly through the great change in temperature.

Mr. Billings: We don't put our pipes in walls—we keep them in the room. It is very easy to freeze pipes, I know. Of course there are all kinds of objections against hot water; and there are objections against steam. Still, I would very much rather hear any questions on the practice we have been using, than any relative differences between hot water and steam. It is really those who have made up their minds that hot water is best that we intended more to speak to. There are no better judges, I think, of whether, in an ordinary building, one kind of heating is better than another, than the nuns. They like to be warm, and they are in the house all the time, and I have spoken to a number of those that are in command of the heating apparatus, and I never yet found any of them that believed steam to be better. The Superior of the Providence Nuns, in Montreal, came from Boston, and she got Mr. Wallworth to put into the very large building a low pressure steam heating apparatus, which is magnificent so far as fitting and practice are concerned. When they went to build their other house, which was just about the same size, they had been making comparisons with steam, and they found the difference was over a hundred tons of coal in a building of the same size, so adopted hot water instead.

#### HINTS ON ESTIMATING.

BY OWEN B. MAGINNIS.

WHEN figuring on special finished joiners' work, as cupboard fronts, closet fronts, doors, dressers, etc., if in quantity, send the list to the mill for an estimate, and add your own percentage of profit; if one or two only, figure on the time and stuff your own workmen will consume in making them and add profit, and avoid taking mill prices for shop prices, and *vice versa*.

If you have a job of fencing to do in the early spring, do not make the common mistake of allowing only the ordinary time for digging the post holes. It must be remembered that the surface of the ground is impregnated with solid frost to a depth averaging from 18" to 36", and it is so hard that it must be broken with a crow-bar or pick-axe, which will take twice the time to do; therefore charge twice as much as in summer time. Another thing, before figuring on digging of any description, survey your ground carefully, and if necessary use the boring rod to ascertain what sort of material your men will have to handle, and estimate according to its nature and the time you know from experience it will take them to complete the job.

If a carpenter has doors to trim up to 7' 6" high, which have common straight faced jambs and ordinary corner blocks, trimmed and molded casings, he can safely figure setting the jambs at 15 cents a set and trim at 15 cents a side complete, as a good mechanic will set 20 sets of jambs in a day and put on 25 sides of trim. Figuring wages at \$2.50 per day, the builder will get a good profit.

A good mechanic will fit and hang 12 pine doors in a day of ten hours, and do them right, so with wages at \$2.50 per day, pine doors can be fitted and hung for 25 cents a piece. By following this simple method of estimating labor, any builder *who knows his men* may calculate his labor very safely.

Never overrate your men, and if you are unacquainted with their capabilities as mechanics, make your arrangements so that if you can't change them for better, you may not lose by their slowness or want of skill. It would be wise to select an efficient staff of rapid and accurate mechanics and retain them while it is possible, and when you must lay them off retain their addresses, so that you may again hire them when necessary.

When approximating nails in quantity, it is wise to allow a certain percentage for poor nails, bent nails, and those lost or spoiled in driving, as this always in all cases tells.

Finally, as profitable estimating consists in providing against the expenditure of time, labor or material likely to be unprovided for, it is judicious to spend all the time possible in making allowance for small details which are absolutely necessary, and which only involve more expense and loss if not provided for in the amount of the estimate when sent in.

#### "PLASTER AND PLASTERING."

TORONTO, February 13, 1891.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—I have just come across a book in the Public Library, No. 1319 D, entitled "Plaster and Plastering," by Hodgson, and as there are a number of statements in it that are not quite correct, with your permission I will point some of them out.

To be as brief as possible, I have not quoted the statements in the book that require correction, but simply italicised the word that shows the correction. For example, on page 11 it says that "a darby is a float," so I have italicised the word "not" as follows: "A darby is *not* a float." With the above explanation the reader will understand the corrections following:

P. 12.—*No* mould will finish a mitre.

P. 17.—Laths should *not* be made of hemlock, as they will often twist off the ceiling.

P. 23.—Very fine sand is *not* well suited for plastering. Burnt clay should *never* be used as a substitute for sand in plastering, as it is only a question of time when it will fall off.

P. p. 27 and 28.—Mastic should *not* be put on with a brush, but with a trowel. Portland cement and chalk would be *far more* likely to crack than Portland mixed with sand.

\* P. 31.—Sands for floating should *not* be formed close together. The less you have the better, as they get dry, and when you fill in between them, the mortar shrinks and leaves a hollow space between. Any room from 12 to 20 feet would only need one screed in the centre of the ceiling in addition to one running round the angle; and for floating in the wall, if height does not exceed 14 ft., one screed at the top would do, put on horizontally, and the ground at the bottom forming the other.

P. 32.—The floating for stucco should *not* be left smooth; it should be left level and true, but a good key left in it from the rule.

P. 33.—Putty and plaster for cornices (or any other work) after getting stiff should *never* be wetted or knocked up to retard the setting. To do so is to kill it.

P. 37.—For outside work Plaster of Paris should *never* be used, but either Portland, Medina, or Roman cement.

P. 48.—The scratching for first coat of plastering on lath work should be done the same day that it is put on, and *not left* for three or four days. The second coat does *not* need scratching.

P. 49.—There is *no trowel* used for hand floating, but a hand float.

P. 64.—Under the head of "Items," the book gives the cost of 100 yards of three coat plastering, with wages for plasterer at the rate of \$3.00 per day. The total cost is \$16.00, or 16 cents per yard. The conclusion is arrived at as follows:

7 bushels of lime @ 30 cents	-	-	-	\$ 2.10
4-5 of a load of sand @ \$1.25	-	-	-	1.00
9 lbs. of hair @ 65 cents (\$5.85?)	-	-	-	3.15
5 lbs. of nails @ 4½ cents	-	-	-	.22
Lathing 100 yards @ 2¼ cents	-	-	-	2.25
Labourer 1-5th of a day	-	-	-	.33
Finishing, 1 days' work	-	-	-	3.00
Making mortar and scaffolding	-	-	-	1.50
Plastering, 2 coats, 1 man ⅔ of day	-	-	-	2.00
				<hr/> \$16.00

You will notice the hair is of a very fine quality if price is anything to go by. It must surely be "Plasterers' Hair," as we sometimes see advertised, and not "Cow Hair for Plasterers' Use." Then again there are no laths used, although the nails were there, and also the lather who charged his time. No putty or plaster used, and yet the plasterer finished it, or at least got paid for doing so, but it appears there was no labourer, or else he gave his time for nothing.

The beautiful simplicity of the multiplication and addition is a marvel. No wonder it was done for \$16.00. As the book has been written for the benefit of young plasterers, I think it well to call the attention of your readers to the above errors.

Yours truly,

G. M. GANDER.

#### PUBLICATIONS.

A very interesting Christmas number of the *Australian Builder*, published at Sydney, N. S. W., has reached our table. We shall have the pleasure of receiving the *Builder* regularly in future.

That excellent journal, the *Dominion Illustrated*, is steadily improving under its present energetic management, and is as steadily growing in public favor. The enlargement to 24 pages weekly afforded opportunity for great improvement in its literary contents, the contributors to which now include many well-known writers. Historic sketches, healthy fiction, crisp editorials on current topics, bright correspondence from London, New York, Toronto, and other cities, sports and pastimes, humorous sketches, etc., make up with the numerous illustrations, dealing chiefly with Canadian scenes, events and personages, a charming journal for Canadian readers.

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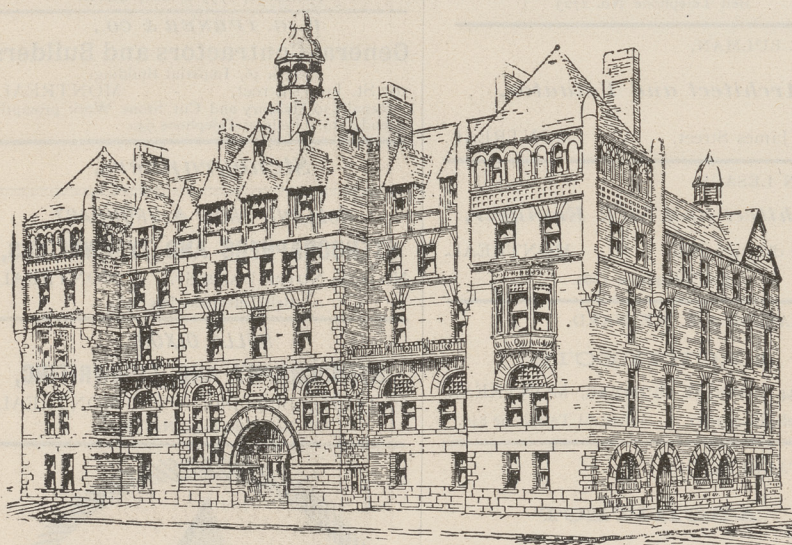
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